The Year in Computing

January 1986
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commodore power/play

Inside The Amiga Workbench

Last-Minute Gift Guide

More Game Reviews Than Ever:

- WINTER GAMES
- BEACH-HEAD II
- SKYFOX
- KNIGHTS OF THE DESERT
- FIREWORKS CELEBRATION KIT
- AND MORE

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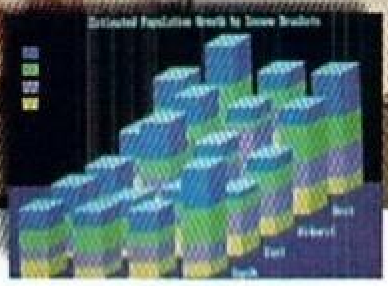

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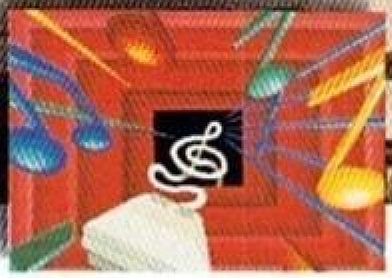

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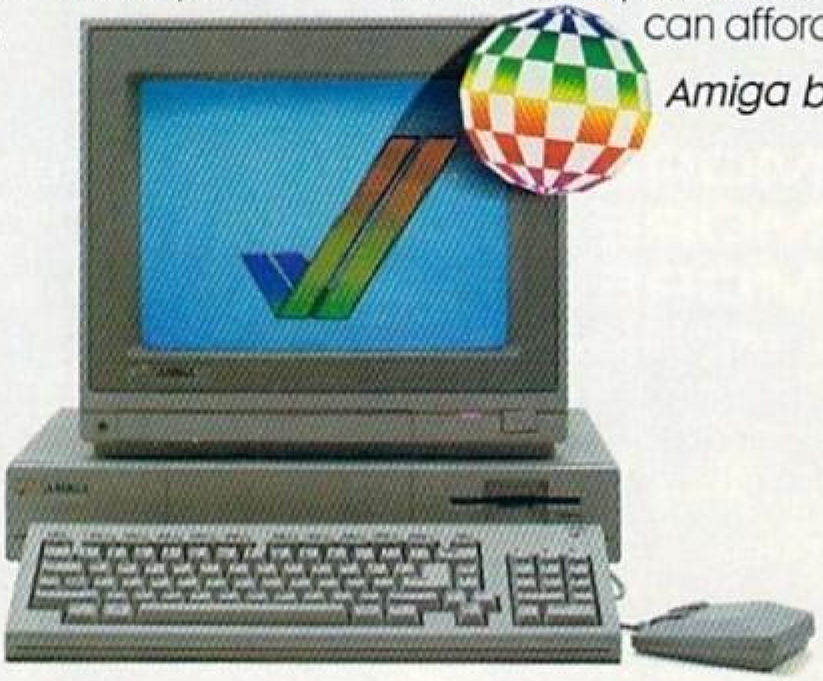

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Disk Save/Protect

To the Editor:

It's sometimes useful to be able to reserve certain tracks on a disk for later use, or prevent programs and files from being saved to disk or to certain tracks. Here's a short, quick 1541 utility which saves/protects an entire disk or designated tracks. It works by writing zeros to the BAM, thereby misinforming the DOS that those tracks have already been used and are unavailable.

```
1 print"save-protect"
2 print"(d) entire disk"
3 print"(t) a track"
4 get a$:if a$="" then 4
5 if a$="d" then x=4:y=143:goto 10
6 if a$<>"t" then 4
7 input"track number";t
8 if t<1 or t>35 then end
9 x=t*4:y=x+3
10 open 15,8,15
15 open 5,8,5,"#"
20 print#15,"u1:"5;0;18;0
25 print#15,"b-p:"5;x
30 for i=x to y
35 print#5,chr$(0);
40 next
45 print#15,"u2:"5;0;18;0
50 print#15,"u:"
55 close 5:close 15
60 print"validate deprotects"
```

Conveniently, the BAM is restored and the save-protection removed simply by validating the disk.

John R. Menke
Mt. Vernon, Illinois

Magazine Entry Program

To the Editor:

While your Magazine Entry Program is very helpful in entering BASIC programs, I find that there are times when I wish to enter a line without the checksum or change the line itself. It would be a great timesaver if there was a way to do this without saving the partial listing of the program, resetting the computer, re-loading the partial program, . . . etc. Is there a way to avoid all of this?

Lance Muggett
Philadelphia, Pennsylvania

There is another command for the Magazine Entry Program besides TEST. It is KILL. By typing KILL [RETURN], you will disable the Magazine Entry Program. This will allow you to enter program lines without checksums at the end. To re-enable the Magazine Entry Program, type SYS 49152 [RETURN], then TEST [RETURN].

Pomp and *Easy Script*

To the Editor:

I purchased my *EasyScript* word processor about six months ago. Until recently, I thought that I was using the program to its fullest. One day, I happened to enter a CTRL-3 from within command mode. To my astonishment, out came a lovely rendition of Pomp and Circumstance! I thought that I might share this interesting fact with your readers.

Mr. Ben Smith
San Francisco, California

Up 'n Down Bonus Points

To the Editor:

In the August/September issue, you reviewed the game *Up 'n Down* by Sega. In the review it was stated that some of the upper bonuses for completing a level quickly were impossible to obtain.

I would like to point out that these bonuses are easily obtained because of a property of the car that your reviewer seems to have missed. When the car jumps its full distance, it can go from track to track in some cases. By doing this, you can save the time it takes to go back and get flags that are normally missed.

Dave Rawlings
North Smithfield, Rhode Island

Special Printer Codes in *Easy Script*

To the Editor:

I am interested in an explanation of how to direct to the printer the ten

Continued on page 6

SOFTWARE
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ASCII characters referred to on pages eight through ten of the *Easy Script* manual. In addition to a detailed explanation, I would appreciate your assistance in identifying the ASCII codes. I am interested in using this in order to direct my printer to do boldface printing. Pages eight and nine don't adequately explain how to do this. Thank you for your assistance.

Kenneth P. Brooks
Largo, Florida

Easy Script *does not provide a code for every printer function directly from within command mode. This is especially true when you are using a third-party printer that requires you to provide an escape sequence before you can control special printing requirements such as underlining or boldface print.* Easy Script *does, however, provide another way to send these codes to the printer. The procedure is outlined in the* Easy Script *manual on page 8.2.1.*

There are two steps to defining special control characters. First, you must define the characters within the text of the document, then issue the command from within the command mode of Easy Script.

At the beginning of the text (or at least sometime prior to when you want to send the commands), assign the ASCII codes for the commands that you want to send to the printer to a number between one and nine. This is how Easy Script *will identify the command. You do this just as you would set other program parameters in format mode.*

For example, to define an escape sequence that sets a Gemini Star printer to print in italics, enter the following: F3 (function 3 key to get into format mode)

1=27:2=52:3=53[RETURN]

In this example, 27 is the ASCII code for escape, 52 is the ASCII code for italics, and 53 is the ASCII code for standard print mode. Don't forget to include the code to return from the special print mode you are defining.

Now that the codes are defined, you can use them in the text just like any other print mode. When you come to a place in the text where you want to turn on italics, press F1 (function key 1 for command mode), then press the number one. This will place a chr$(27) in the text for escape, and print a one on the screen in reverse print. Now that escape is set, you can send the code for the function you want to enable. Press F1 again to get into command mode again, and press the number two key to include chr$(52) in the text. The number two will appear on the screen in reverse video.

Whatever you type from now on will print out in italics. After you have typed in the word or sentence that you want italicized, press F1 then 1 and F1 once more to get into command mode, and press the number three to include chr$(53) in the text. When this code is sent to the printer, you will return to standard print mode.

Any ASCII code can be sent to the printer in this way. Consult your printer manual to find out what codes are required for the special functions that your printer is capable of.

Phone Kills Software

To the Editor:

I really enjoy your magazines and look forward to reading them each month for all their pointers to aid both novice users (like myself) and those more experienced at computing.

I was a bit upset, though, at the photo accompanying Tom Benford's very helpful article on modems and terminal software in the August/September issue of *Commodore Power/Play*. I assume that the VIP Terminal disk in the photo has had to be replaced, since placing a live telephone on it in that way would surely scramble the data it contains irreversibly. I hope that most of your readers know by now that any source of magnetic energy should be kept as far away from magnetic media as possible.

James Greek
New York, New York

Older 64's and the 1702

To the Editor:

I began computing with an older model (five-pin plug) 64 hooked up to a small color TV. I was not at all satis-

Continued on page 8

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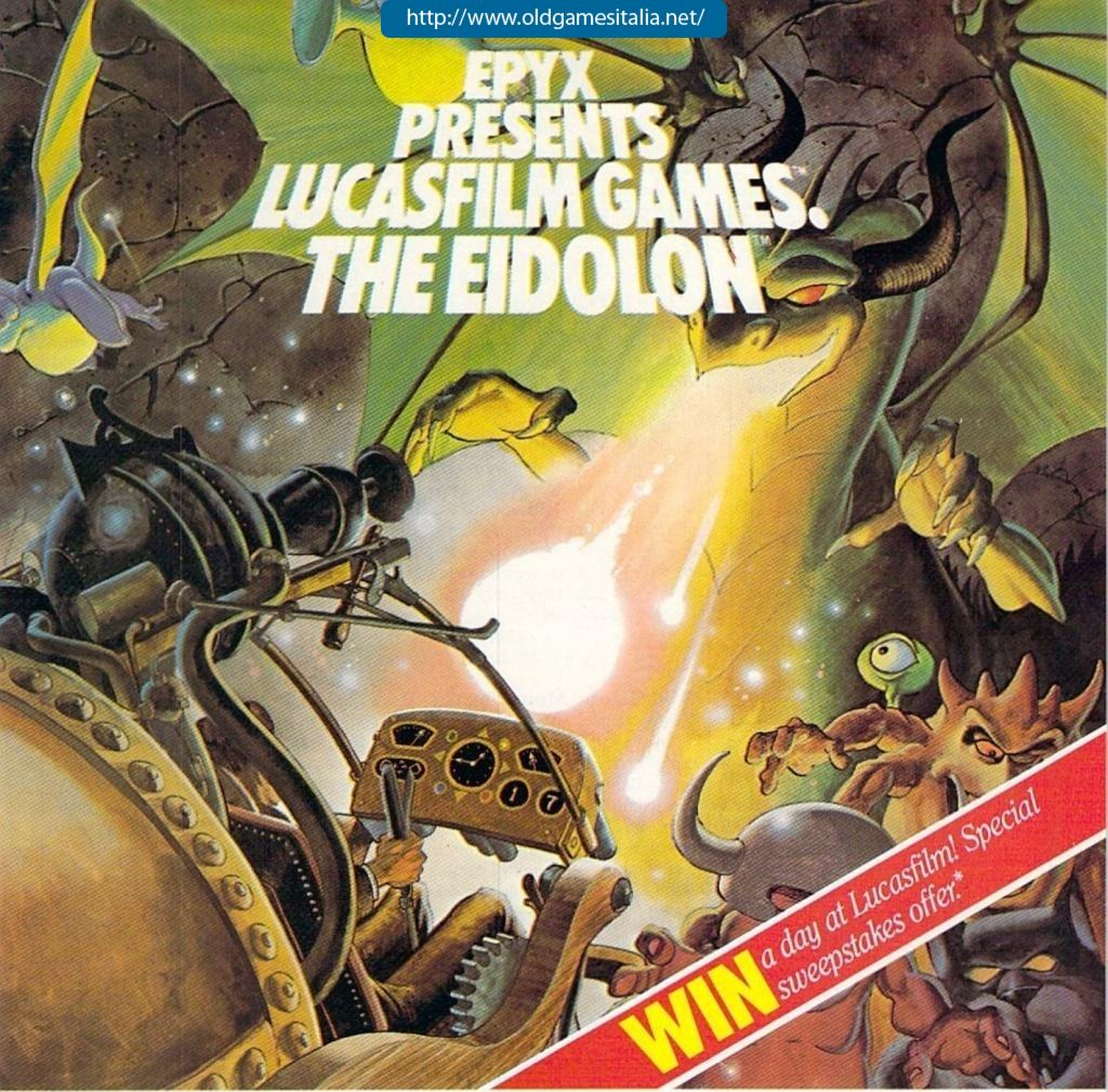
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LETTERS

fied with the clarity of the display. I thought a monitor would solve the problem, so I bought a new 1702. I was satisfied until I viewed a *new* (nine-pin plug) 64 hooked up to a 1702. The difference was quite noticeable.

I was so unhappy that I even considered buying a new model 64. Then I noticed an ad for a monitor improver cable from Bytes & Pieces, "Hook up Your Old C64 to the New 1702, You Won't Believe the Difference!" In reality, I felt that it was just advertising hype, but it was cheaper than a new 64 and at least worth a try.

It really works, and you won't believe the difference! Anyone who has an old five-pin 64 hooked up to a 1702 will benefit from this product. There are also other cables available. It is certainly at least worth mentioning for those who may have the same problem that I had.

Carl E. Grohs, Jr.
Altavista, Virginia

Operation: Mock Turtle

To the Editor:

The article in the August/September *Commodore Power/Play* by John Conway entitled "Operation: Mock Turtle" was interesting and informative. I intend to follow the instructions in the article and build a turtle robot. However, I cannot find Figure 7 mentioned on page 89 in my copy of the magazine. Either I missed it or it was not printed. Could you please tell me how I could get a copy of the missing Figure 7?

John R. Weaber
King of Prussia, Pennsylvania

Due to space limitations, Figure 7 had to be omitted. It was simply a photo of the finished Mock Turtle. The reference to Figure 7 in the text was left in accidentally.

To the Editor:

I'm writing about the article "Operation: Mock Turtle" by John E. Conway in the August/September issue of *Commodore Power/Play*. I would like some information.

Ever since I got into computers, I have been wanting a robot. I really wanted one. I have compiled quite a stockpile of parts, and I have read many articles on robots. I have not yet, however, read anything that completely fulfills my needs.

I'm not an electrical technician, but I know a little, though not too much. I read the article and made the robot. It took me four straight days working day and night once I got the parts, but I got it to work. This is my first working robot.

I would like to make the robot bigger and more powerful. What I would like to do most is to cut the control cord like the article said. That would be great. Plans, information, advice, a name, anything from anybody would be a tremendous help. Thank you. Forgive the writing, it's 3:00 a.m.

Joe Parker
Watertown, New York

Author John Conway responds:

Let's take a stab at your wants one at a time.

1. Bigger and More Powerful: The Capsela motors are pretty weak, but adequate for most hobbyists. But for those power hungry experimenters, I suggest replacing the Capsela motors with gear motors available from local advertising display supply shops (DC gear motors/12Vdc /1, 2, 4 or 8 RPM for high torque). They are also available from Edmund Scientific Co., Barrington, NJ.

2. Cordless: This problem is more complex. Capsela has introduced a remote-control unit capable of handling up to two motors simultaneously. Dubbed the ICR5000 Infrared Remote Control, the unit will be available from local toy shops or from Capsela c/o Play-Jour, Inc., 200 5th Avenue, Suite 1024, New York, NY 10010 in time for Christmas. With this gadget and a tad of ingenuity, a cordless robot can be constructed. Good luck!

Commodore Power/Play welcomes letters from readers. Do you have an unusual application for your Commodore computer? Do you wish to comment on an article? Would you like to make a suggestion on how we can better serve our readers? Please send them to:

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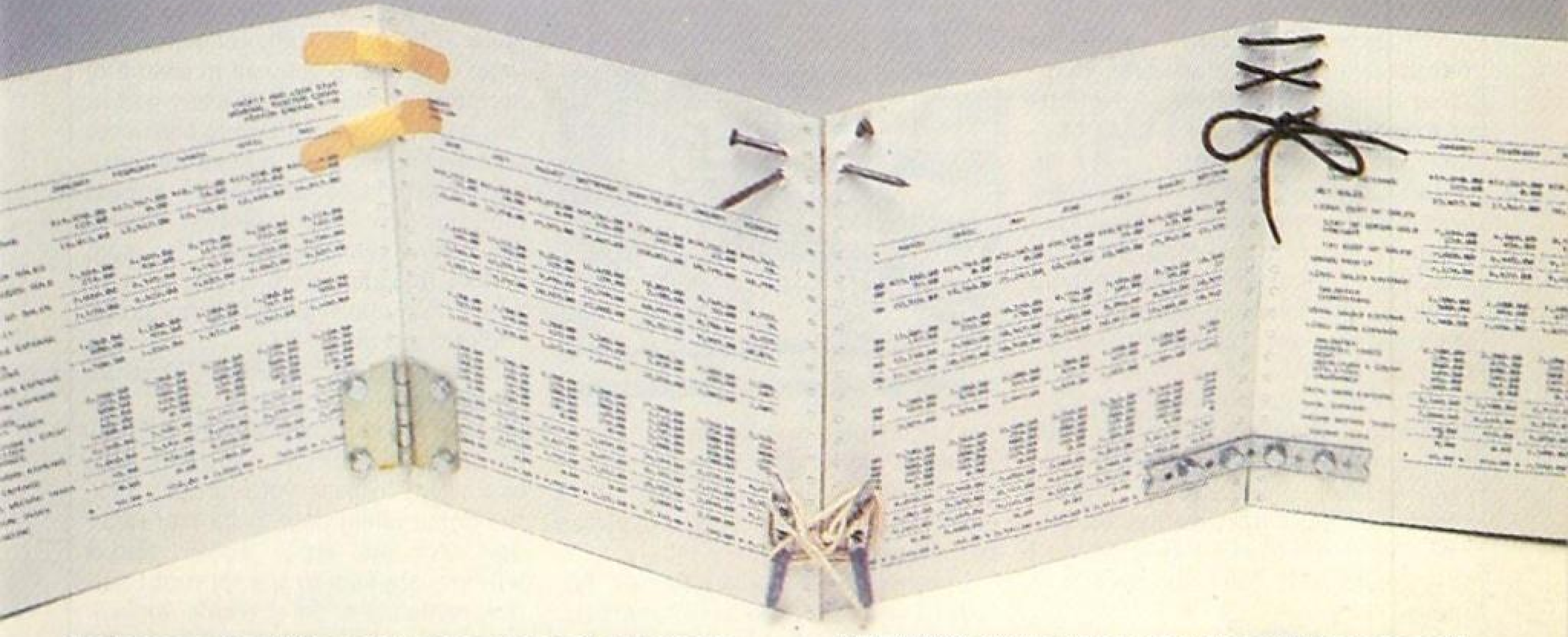

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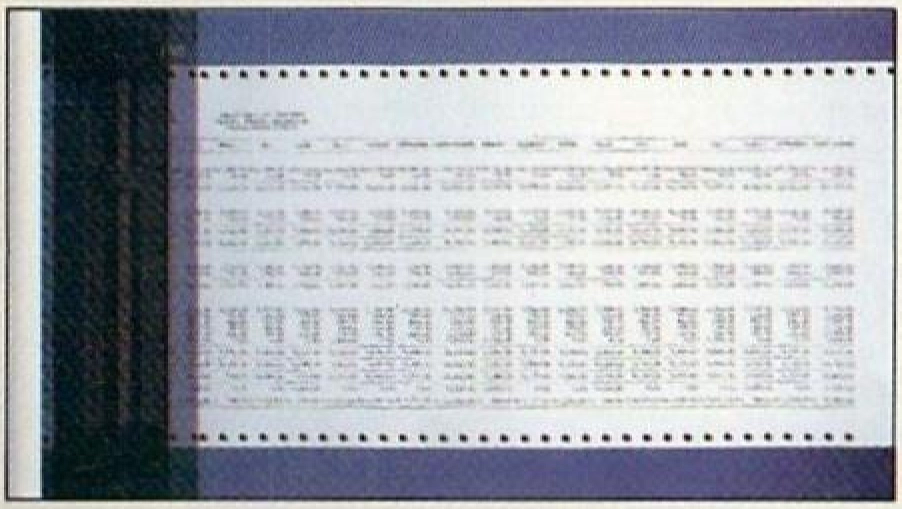

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ADVENTURE ROAD

BY SHAY ADDAMS

Infocom Introduces 128K Adventures

Everyone who has played Infocom's *Wishbringer* probably wonders why the game didn't award you with ratings like Novice Adventurer, Bumbling Charlatan, or Master Adventurer to reflect your progress. Brian Moriarty, the game's author, says he didn't want to omit the ratings but was forced to cut them out because of memory restrictions—the program that runs the adventure (by keeping track of your location, inventory and information) eats up a substantial amount of RAM. That won't be a problem with Infocom's new line, "Interactive Fiction Plus," adventures that can only be played on computers with at least 128K of RAM. Steve "Planetfall" Meretzky wrote the first one, *A Mind Forever Voyaging*, so I asked him why Infocom made this move.

"Having 128K to work with removes a lot of limitations," Meretzky explained. "*Forever Voyaging* has close to 200 rooms (Infocom's largest adventure to date) and the biggest vocabulary (over 1,700 words). In future games, we'll be able to do more character interaction and story-oriented games in this line."

The parser is pretty much the same, though Infocom programmers can now add little conveniences for which they previously couldn't afford the memory. (If you're happy with your Commodore 64, don't panic—Meretzky guarantees that Infocom will continue to design adventures for your computer as well as for the 128 and the Amiga.)

Meretzky says *Voyaging* is a four-stage science fiction game in which the player becomes the world's first thinking computer. It is the year 2031, and you must determine the effectiveness of a plan to secure a safe future for the world. He says he's still got a detective game in the works, but hasn't had time to get to it yet.

A Mind Forever Voyaging *has close to 200 rooms (Infocom's largest adventure to date) and the biggest vocabulary (over 1,700 words).*

And yes, there will be another *Zork*. Actually, it's the next game in the *Enchanter* series. Tentatively called *Conjurer*, this one is slated for release by Christmas.

In other Infocom-related news, Michael Berlyn (*Suspended, Cutthroats, Infidel*) has left the Circle of Enchanters and started an independent development company with his wife, Muffy. He says she contributed extensively to *Suspended* as well as *Oo-topos* and other games he designed before joining Infocom, and they already have two new adventures in the design stage. They also intend to develop non-gaming software, toys and other products. And Berlyn recently completed his third science fiction novel—he spent four years writing this one—*After the Change*. It's a good example of a medium all adventure fans should check out—non-interactive literature.

The Ultimate Treasure Hunt

Zork, Cutthroats, Death in the Caribbean—these and numerous other adventures share a common premise: a search for hidden treasure. Now Spinnaker's Windham Classics have spun an interactive tale based on literature's most famous treasure hunt, Robert Louis Stevenson's *Treasure Island*. The program was developed by Byron Preiss Video Productions and employs the same kind of graphics seen in *Dragonworld* and *Fahrenheit 451* (also produced by Preiss for Spinnaker).

Instead of a full-screen illustration for each scene, a horizontal bank at the top third of the screen shows one to three mini-scenes. Below, up to 12 text lines describe the situation. The mini-scenes might show different characters, such as Long John Silver or Dr. Livesy, or different parts of a room or the ship you sail in search of buried gold. Music plays a key part in this game, and the SID chip has never sounded better in an adventure. Intricate harmonies and lively tunes, ranging from gusty pirates ballads like "Blow the Man Down" to staid British melodies with classical overtones, frequently provide appropriate background music.

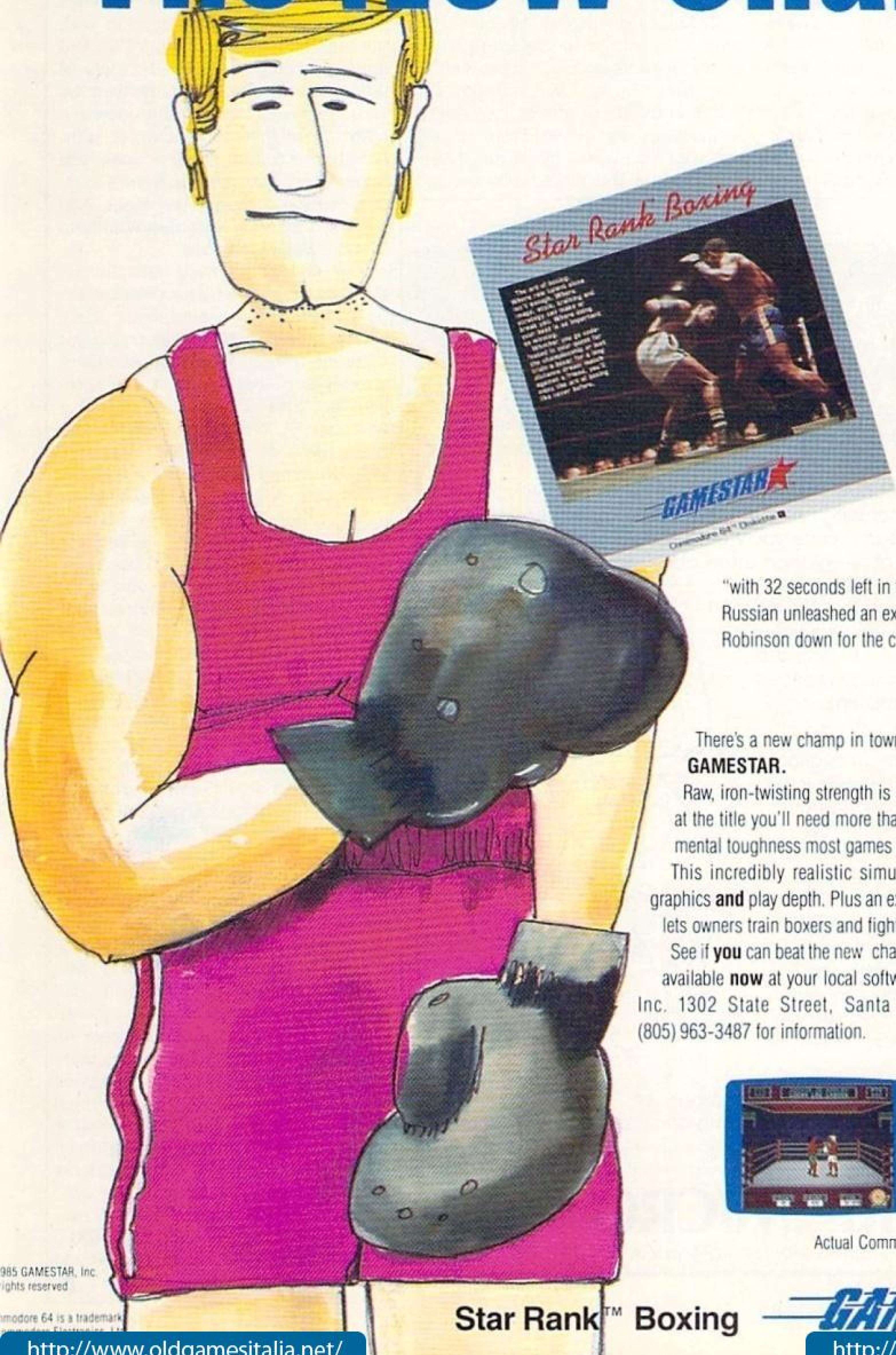
Spinnaker recommends *Treasure Island* for players ten and older. I concur, for it's not that difficult, but still hard enough that you won't finish it overnight. In case you do get stuck, the game offers help in its WordWindow. You just type "words" and a window appears in the top-right corner, revealing a list of words applicable to the immediate predicament. This program's parser permits you to converse fluently with Long John Silver and the rest of the crew. The vocabulary consists of less than 300 words, all listed in the manual's reference section. The graphics are meticulously drawn and quite colorful.

More than anything else, though, I enjoyed the atmosphere of this game. The different stages of progress are divided into chapters, like a book, and the puzzles are more situation and character-oriented than simply consisting of a series of individual object-oriented problems. It would be especially good for families to play together.

So would another new graphic adventure from the Windham Classics collection, *The Wizard of Oz*, in which the player relives the role of Dorothy in her journey through Oz. Graphics are similar to those in *Treasure Island*, but the parser is better. It has a larger vocabulary and understands prepositions and other parts of speech not

Continued on page 12

The New Champ.



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– Gamestar Gazette
July 22, 1985

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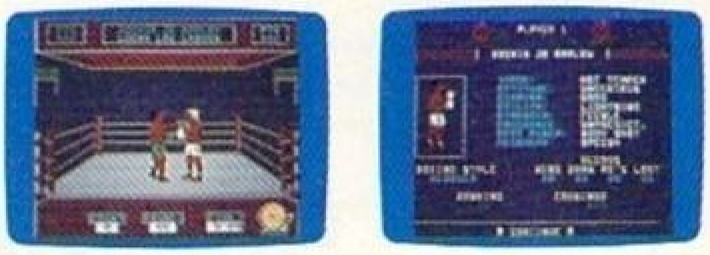

Actual Commodore 64™ screens

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Star Rank™ Boxing GAMESTAR

recognized by some other games. This facilitates carrying on even more elaborate dialogue with the Munchkins, Straw Man and other people you'll meet while traveling the Yellow Brick Road. You can "talk about" a topic to a character, "tell" them about something, "ask" questions, and even inquire "now what?" for a clue. (Like *Treasure Island*'s parser, however, this one is insufferably slow when it processes multiple commands—which defeats the purpose of typing in two commands at once.) The WordWindow feature is also available.

Consisting mostly of classical themes, music is as important in *Oz* as in *Treasure Island*. Unfortunately, you won't hear "Ding Dong, the Witch Is Dead" or any of the familiar songs from the movie. Even so, the compositions heard in *Oz* and *Island* are some of the most well-executed music in the worlds of adventure.

Windham's *Alice in Wonderland* offers a fascinating adaptation of Lewis Carroll's classic fairy tale. It relies heavily on character interaction with the March Hare, the Chesire Cat, and more than 60 other folks who dwell in the fantastic land Alice (played by you) discovers after falling down a rabbit hole. Instead of using a standard parser to input your actions, you select one of 20 options from a joystick-controlled menu, the same system introduced in an earlier Windham Classic, *Below the Root*.

The characters have specific responses for each of your possible actions (tease, argue, sing, coax, etc.), and it can be lots of fun just trying out different things. There are scores of objects to collect, many of which represent clues. The goal is to find a way out of Wonderland before the time limit of 60 "days" expires. Though aimed at a young audience, this game will prove enthralling for many older adventurists. All the Windham Classics are selling for $26.95, a genuine bargain these days.

Another bargain is the "Ready-to-Run" line of all-text adventures from Codewriter, who distributes games developed with its *AdventureWriter* program (reviewed in the September 1985 *Commodore Power/Play*). Each $19.95 package contains two or three different games with a common theme: Sherlock Holmes, time travel, thrillers, and so on. Future releases will include graphics depicting key locations. The latest version of *AdventureWriter* features a built-in graphics editor for drawing color pictures. Better still, it enables you to convert Koala-created graphics for use in your own adventures.

Anyone using Electronic Arts' *Adventure Construction Set* should consider joining the *ACS* club recently started by Ken St. Andre, author of the classic "Tunnels and Trolls" role-playing game. With the blessings of Electronic Arts and *ACS* programmer Stuart Smith, the club will publish a newsletter with inside development techniques. Members can also trade and buy games created with the system. (For details, write to Ken St. Andre, 3421 E. Yale, Phoenix, AZ 85008.)

Until next time, keep on adventurin'. ■

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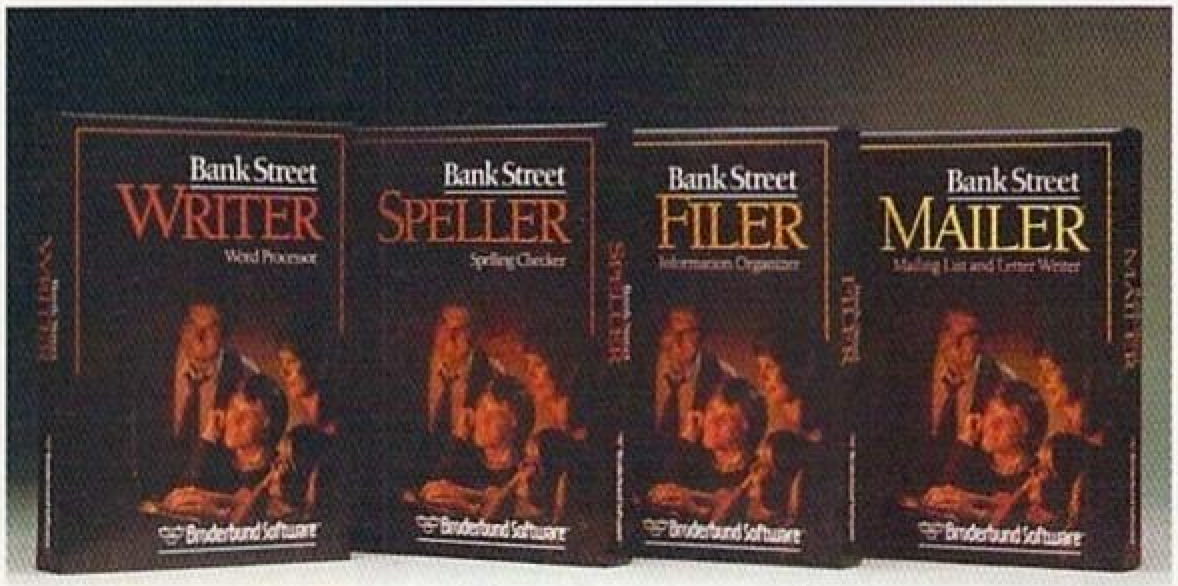
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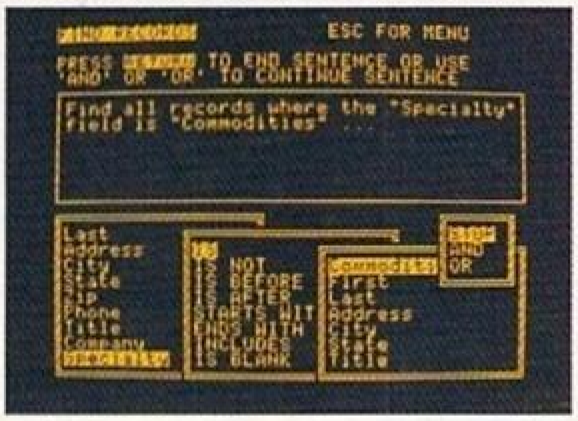

```
                         ESC FOR MENU
PRESS RETURN TO END SENTENCE OR USE
'AND' OR 'OR' TO CONTINUE SENTENCE
Find all records where the "Specialty"
field is "Commodities" ...
```

Last
Address
City
State
Zip
Phone
Title
Company
Specialty
IS
IS NOT
IS BEFORE
IS AFTER
STARTS WIT
ENDS WITH
INCLUDES
IS BLANK
Commodities
First
Last
Address
City
State
Title
AND
OR

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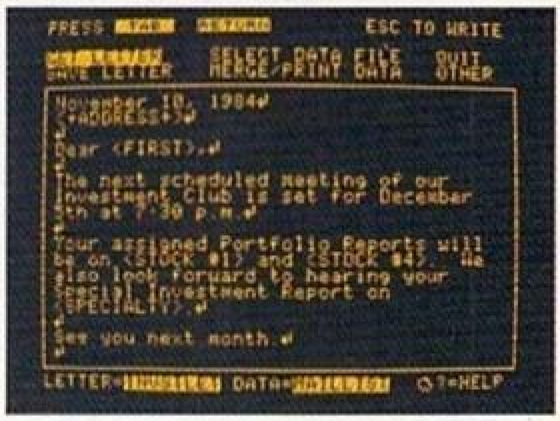

```
November 10, 1984↵
<ADDRESS>↵
↵
Dear <FIRST>,↵
↵
The next scheduled meeting of our
Investment Club is set for December
5th at 7:30 p.m.↵
↵
Your assigned Portfolio Reports will
be on <STOCK #1> and <STOCK #4>.  We
also look forward to hearing your
Special Investment Report on
<SPECIALTY>.↵
↵
See you next month.↵
```

PRESS TAB RETURN
ESC TO WRITE
EDIT LETTER
SAVE LETTER
SELECT DATA FILE
MERGE/PRINT DATA
QUIT
OTHER
LETTER=
DATA=
?=HELP

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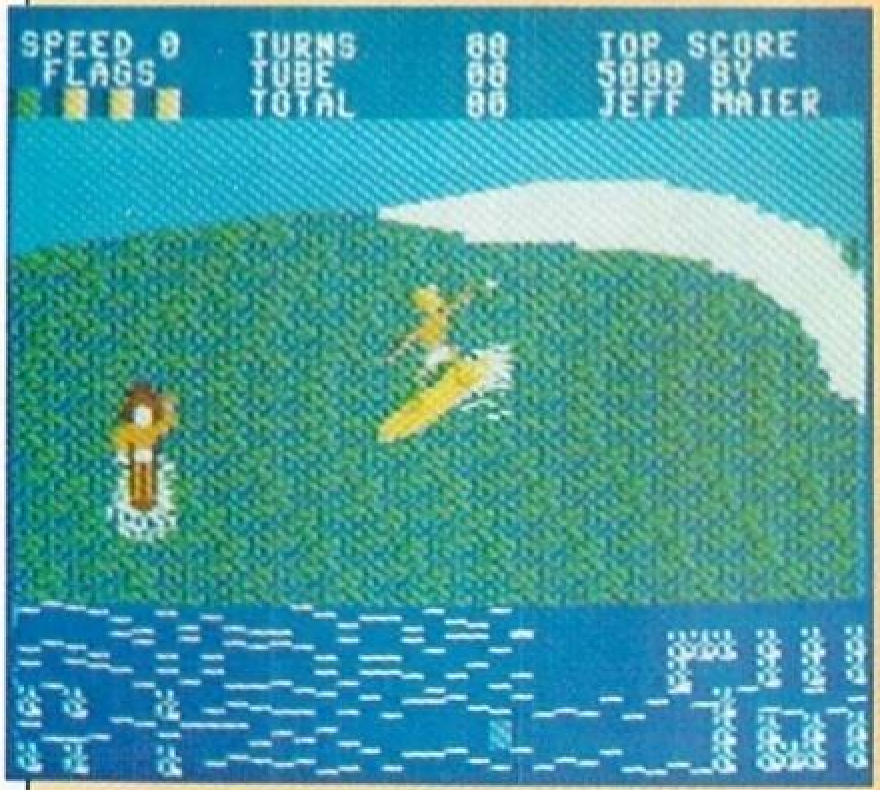
POWER/PLAY'S NEWS FROM THE FRONT



Surfer Videogame

Surfer Magazine is releasing **Surfer Videogame** for the Commodore 64, an arcade-style game in which you control a surfer riding the waves of a turbulent sea. Designer Jeff Maier of Laguna Beach, California — a surfer himself — built the real-life dynamics of surfing into the game as much as possible, so the waves appear to act like real waves and the on-screen surfer in controlled by "feel" rather than thought.

Beginners can set the game to "safe" in order to learn how to maneuver their surfer without constantly getting "wiped out." Scoring for experienced players is based on the same rules employed in professional surf contests. Points are accumulated for the length of the ride, and extra points are given for the number and difficulty of the maneuvers made on the wave, as well as for the amount of time spent in the "tube." Real pros can increase wave speed (there are ten speed settings) for a more difficult game — and higher points. The game also provides the ability to perform aerial maneuvers and "hang ten" over the nose of the board for additional points.

(Surfer Magazine, 33046 Calle Aviador, San Juan Capistrano, California 92675.)

World of Commodore III Announced

The third annual World of Commodore computer convention will be held December 5-8 this year at the International Centre in Mississauga, Ontario, just outside Toronto.

Commodore will show its newest computers, including the Commodore 128 and Amiga. Other products on display will include Commodore-compatible systems and services, such as printers, disk drives, monitors, modems, books, magazines, computing courses, software, furniture and other peripherals and accessories. Leading experts in Commodore computing are scheduled to speak on a wide range of subjects, and will also demonstrate new software for the Commodore 128 and Amiga computers.

Last year's World of Commodore show had more than 40,000 visitors, making it the largest and best attended computer exhibition in Canada. This year Commodore expects the show to surpass those results.

For further information about the show, contact Hunter Nichols, Inc., 721 Progress Avenue, Scarborough, Ontario M1H 2W7 Canada, 416-439-4140.

Built-in Speed Loading

Activision has introduced a new built-in software feature that speeds loading of the company's Commodore 64 disk products by over 400%. Called QuickDrive, the feature will first be available on Activision's newest titles: **Web Dimension**; **Master of the Lamps**; **Rock'N Bolt**; **The Music Studio**; **Alcazar: The Forgotten Fortress**; **Countdown to Shutdown**; and **The Great American Cross-Country Road Race**. (Activision, 2350 Bayshore Frontage Road, Mountain View, CA 94043)

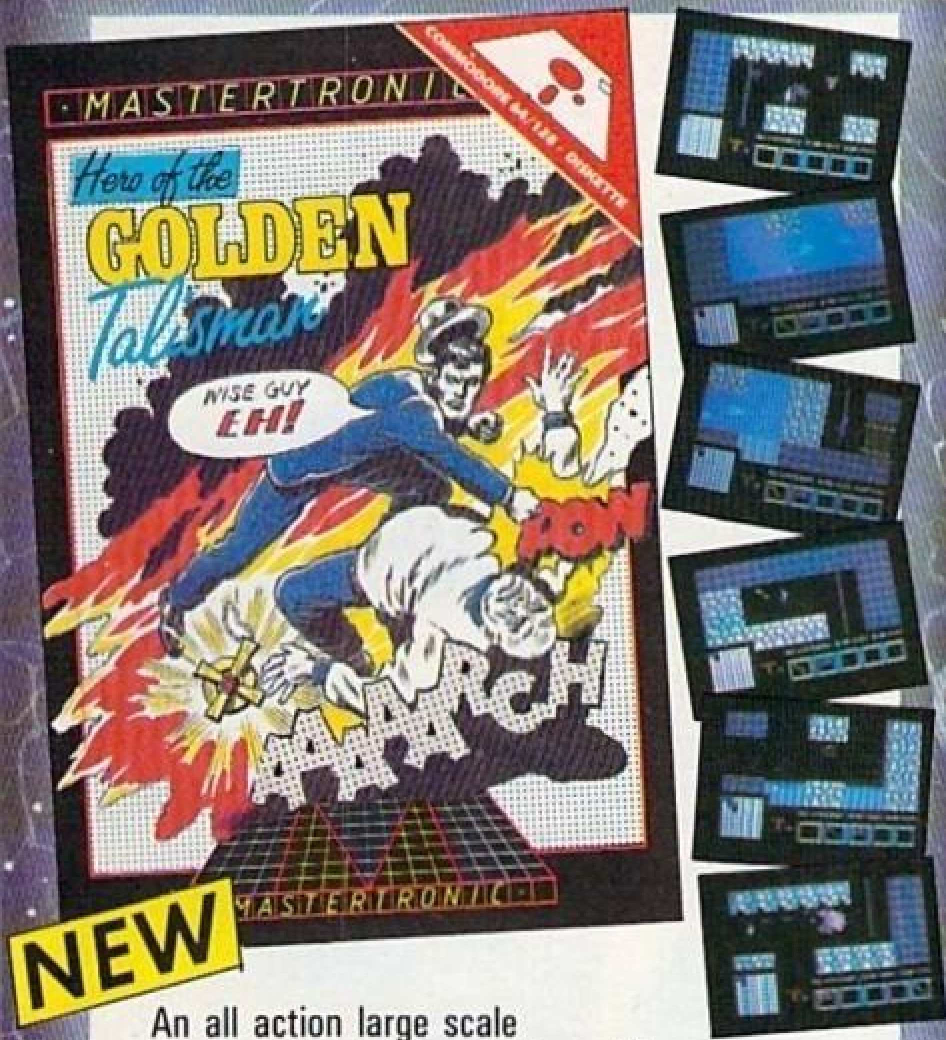
Cartridge Expander

Cartridge Expander plugs into the cartridge slot on the back of the Commodore 64 or 128 and allows you to then plug in up to three cartridges at one time. The unit works with any cartridge or other device that would normally use the expansion port. A three-position selector switch lets you switch easily between game cartridges and other programs, saving wear and tear on the cartridge connector. The Cartridge Expander also features a built-in reset switch. The retail price is $24.95. (Navarone Industries, 19968 El Ray Lane, Sonora, CA 95370)

Life on the Fast Track

Activision recently released **Fast Tracks: The Computer Slot Car Construction Kit** for the Commodore 64. The program lets you construct an on-screen slot car track, and then race on it in a custom-designed slot car. Pre-designed courses are also included for impatient racers. (Activision, 2350 Bayshore Frontage Road, Mountain View, California 94043.)

THERE'S NO BEATING ·MASTERTRONIC·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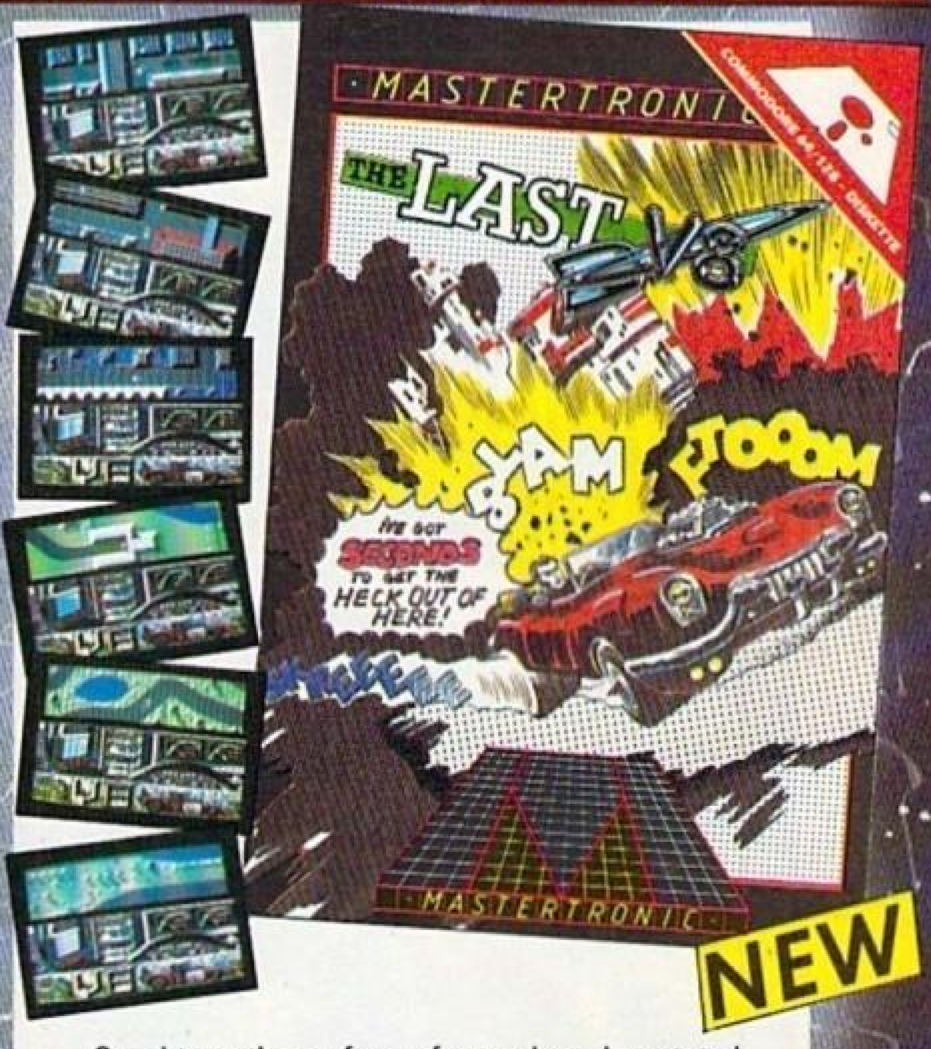
MASTERTRONIC
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THE LAST V8
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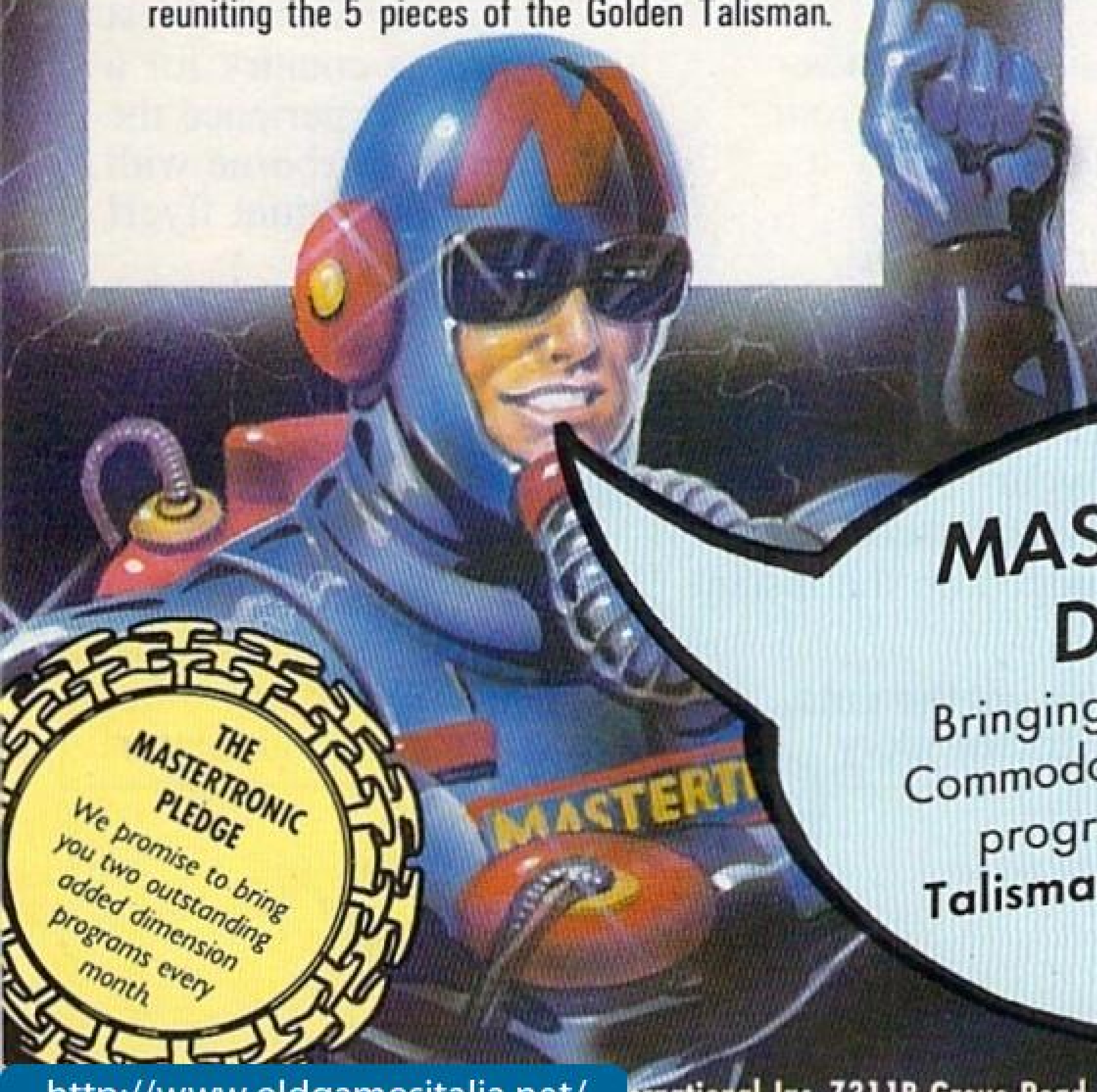

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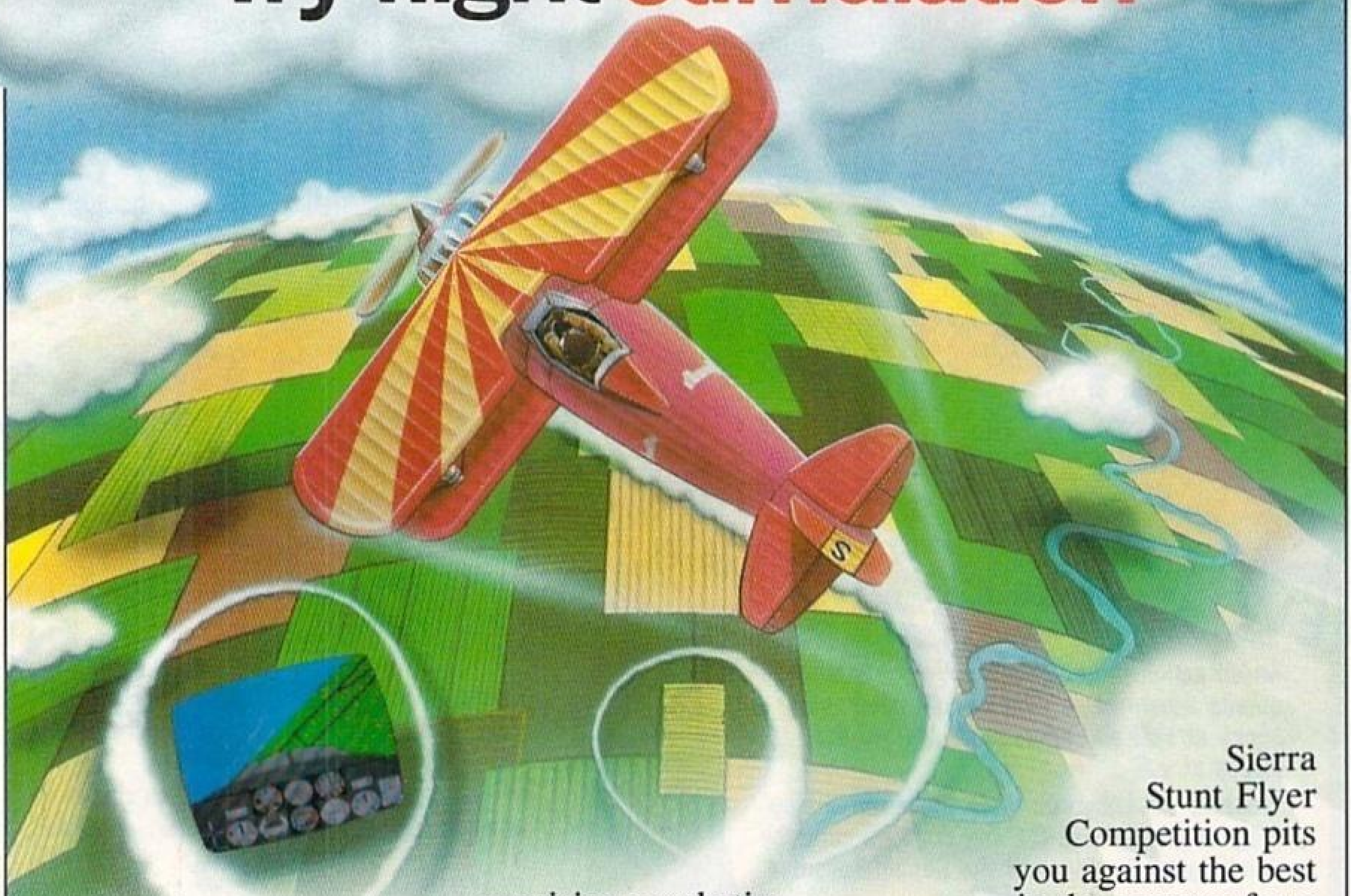

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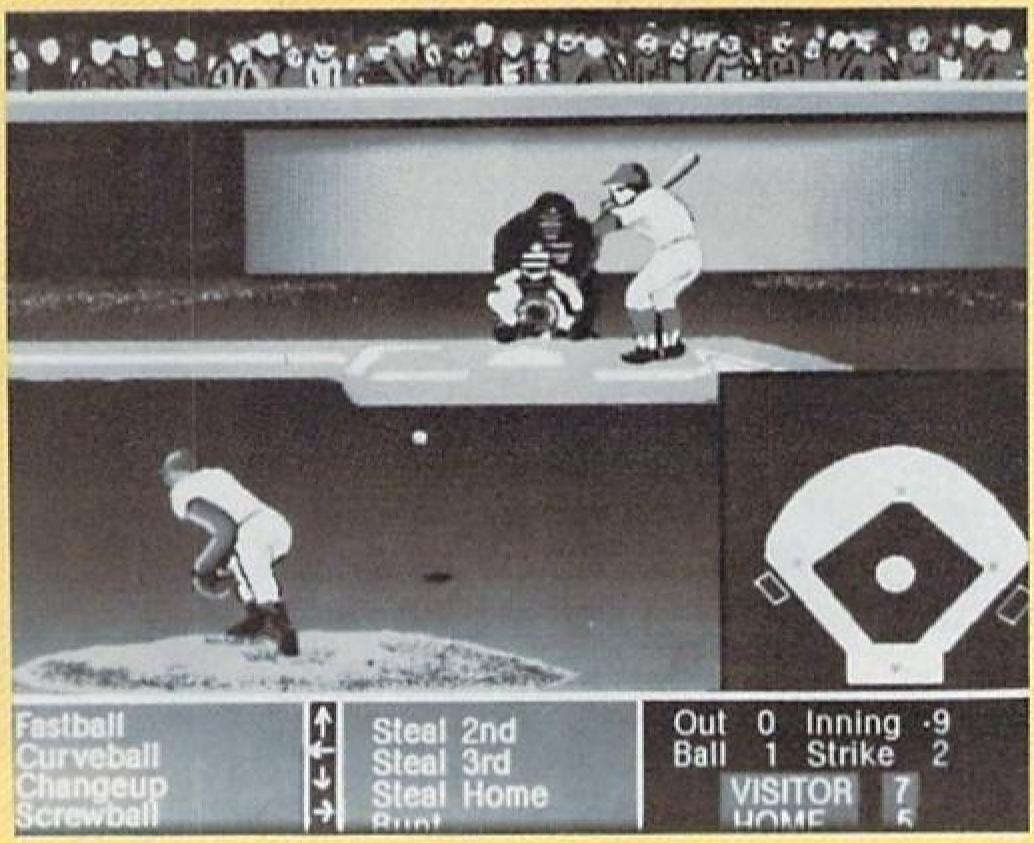
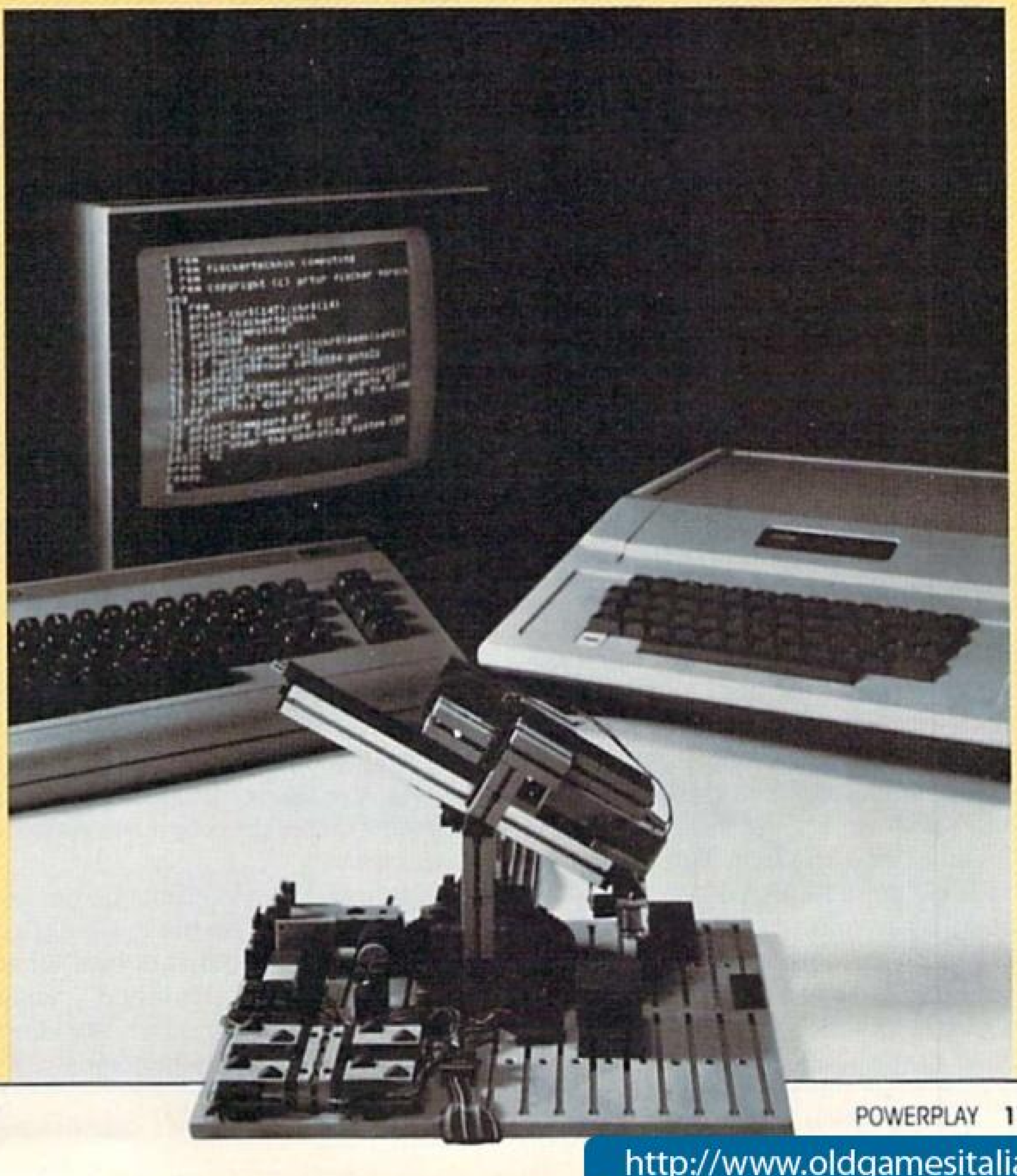


Batter Up

Accolade, a software firm established by two former Activision founders, has released **Hardball**, a computer baseball game for the Commodore 64 that features three-dimensional field perspectives. Up to six different pitches may be thrown by either a right- or left-handed pitcher. Manager decisions like intentional walks, substitutions, bunts, base stealing, and infield/outfield position are controlled by the player.

Hardball retails for $29.95. (Accolade, 20863 Stevens Creek Boulevard, Cupertino, California 95014.)

Mini-Robots Teach Computer Control



The Fischer-Technik robotics construction kit includes two mini-motors, two gears, an electromagnet, three lamps, eight pushbuttons, and two potentiometers that let you create any of ten different robot models.

The traffic light with pedestrian button introduces BASIC and output operations. The machine tool robot simulates a work station that feeds and processes materials. The materials lift moves between three floors, handles priority calls, and stores calls for each level. The aerial rotor antenna rotates to a precise position.

The robotic sorting system sorts objects according to length. The Tower of Hanoi, an ancient Buddhist puzzle, can be solved by constructing and programming a robot to pick up and place puzzle pieces. Yet another robot can be taught to do a job simply by running it through the procedures. The graphic panel robot exchanges a drawing board for the computer screen.

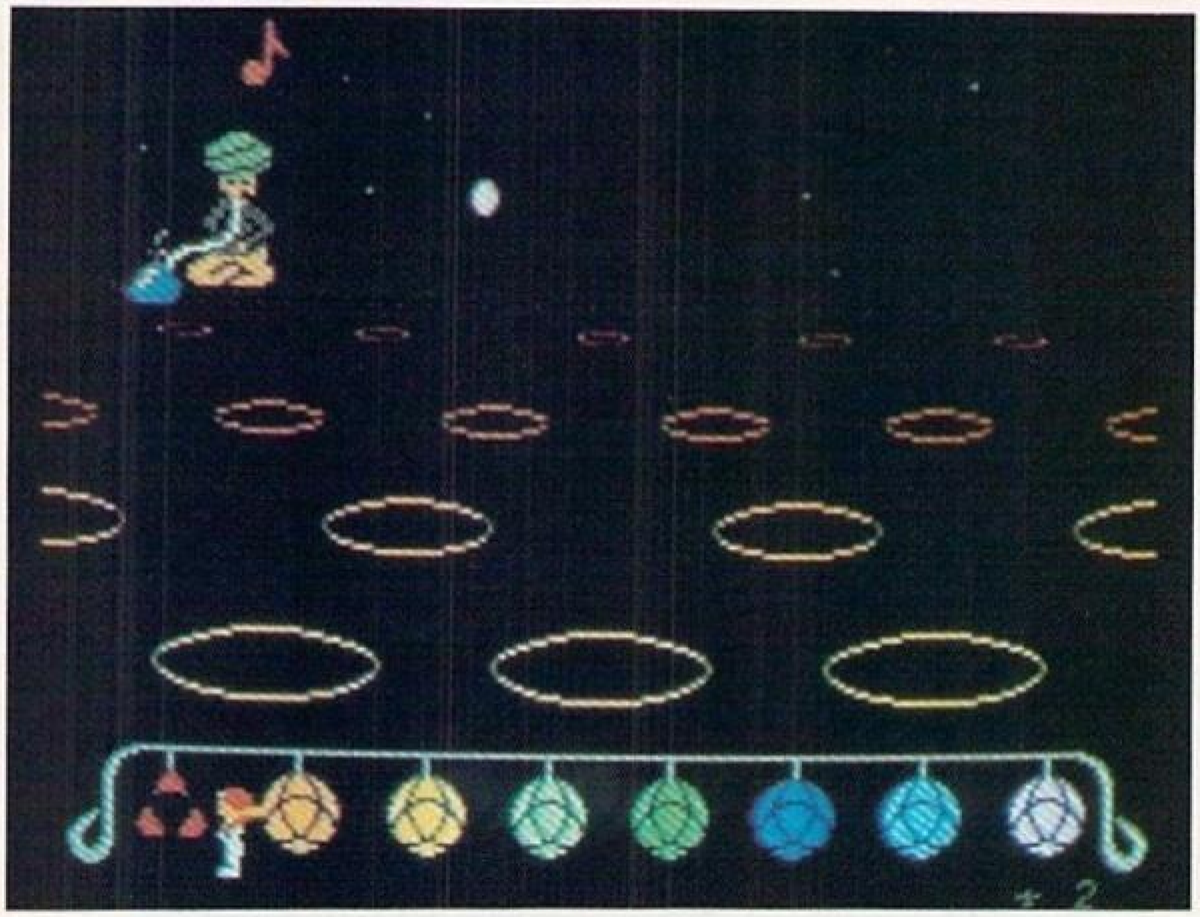
The plotter robot builds a polar-coordinate plotter and displays calculations graphically. And finally, the solar cell tracking model maintains a constant angle toward the sun. The kit retails for $199. (Fischer America, 175 Route 46 West, Fairfield, New Jersey 07006.)

More News on page 127

REVIEWED BY TED SALAMONE

Master of the Lamps

Computer: Commodore 64
Publisher: Activision
2350 Bayshore Frontage Road
Mountain View, CA 94043
Medium: Disk
Price: $29.95



Master of the Lamps begins as you are made a prince. Wealth, power, beautiful escorts, you've got it all. Or do you? Seems several genies have usurped the throne. You've been left with champagne tastes and a beer budget.

So you decide to fight back. Besides vengeance being sweet, there are other benefits to consider. However, luring the three genies back to their lamps to break the spell turns out to be more complicated (and fun) than you can imagine.

First, you must enter their den by piloting a magic carpet through a long twisting tunnel composed of brightly colored diamonds. A first-person perspective heightens the fever pitch, as you make hairpin turns and sweeping maneuvers vital to your mission's completion.

The princely figure astride the woven wing can never die. Colliding with a diamond (before it dissolves into shimmering nothingness) merely puts you back at the beginning of that particular round. Until you get a class-one pilot's license, though, that fate is sufficiently frustrating.

Master of the Lamps provides two control options. Plugging the controller in port one makes it work like a flight simulator (stick forward to fly earthward, back to head for the heavens). Plugged into port two, the joystick becomes an arcade simulator; carpet response is opposite that of the flight simulator. Having that choice is a big plus.

> *Several genies have usurped your throne, and you've been left with champagne tastes and a beer budget. Your job is to lure the genies back into their lamps.*

Once in a magical lair, you must call the genies out one at a time by banging a gong three times. There are a number of brightly colored gongs to choose from. Each produces a pleasing tone. In turn, the genies blow out musical notes that descend onto your on-screen surrogate. That is, unless you can match their output by striking the gongs in proper order. This dissolves the menacing notes as they draw closer. You only have a few seconds to act, so be quick about it.

Each time a musical attack is repelled, you win one seventh of the magic lamp capable of trapping a genie. As the game progresses, more notes are dispatched by your Arabian adversaries.

Selecting the different game options also impacts on the level of playing difficulty. Game one is over when the first genie is "enlamped," while game three is strictly a hand-holding, training-wheel experience meant for making practice runs through various tunnels.

Each genie has his own tactics as well. The first produces colored tones, while the second spews out colored note symbols without the corresponding tones. The final lampdweller is the most insidious of all (especially for tone deaf people like me). He sends forth tones without color-coded notes.

While the graphics are clearly delineated, detailed and colorful, the main attraction in *Master of the Lamps* is definitely the musical score. The tunnel tourneys are undertaken to some rather interesting beats. The accompaniment changes with each succeeding trip, the pace picking up as the higher levels are broached. The soundtrack is so engrossing that you sometimes forget you've got a reason for being there. The next thing you know, you're starting all over again.

Any complaints I have are minor, except for the finale. Imprisoning genies is the primary objective of this entire exercise. Therefore, it is a shame that it's so anticlimatic. They just kind of melt into the assembled lamp. No cheers, no wild screen effects, not much of anything.

While *Master of the Lamps* is by no means *the* definitive musically oriented game, it does widen computer entertainment boundaries sufficiently enough to warrant its addition to your gaming library.

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REVIEWED BY MARK COTONE

Racing Destruction Set

Computer: Commodore 64
Publisher: Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
Medium: Disk
Price: $34.99

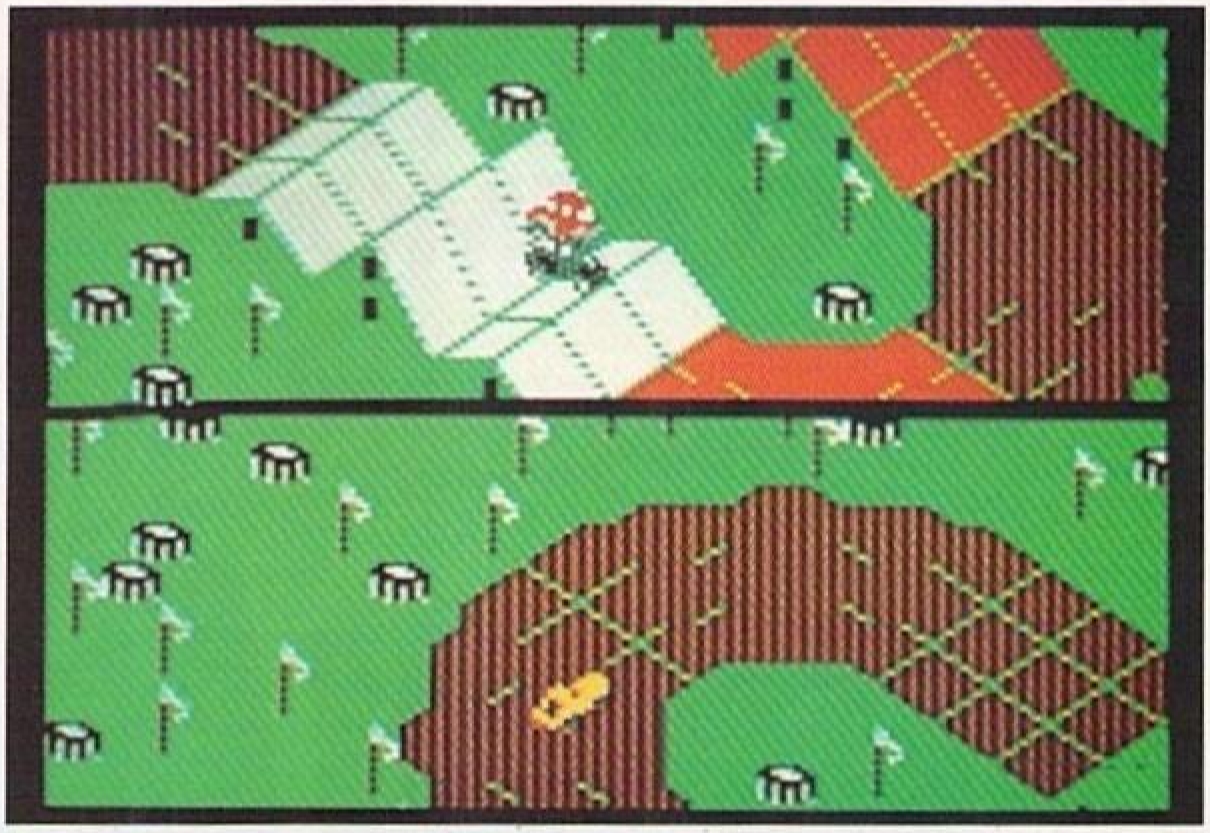
In Electronic Arts' newest release, *Racing Destruction Set*, you construct the race of your dreams.

You have ten different machines to choose from: a Can Am complete with spoiler; a four-wheeling Jeep; two types of motorcycles; a scrappy dirt bike and a spunky street machine; a pick-up truck; a stock car; a tenacious Baja Bug; a spirited Stingray; a streamlined Indy/Gran Prix; and, believe it or not, a Lunar Rover.

After picking your machine, you must modify it. Engine size and tire styles can be changed to suit you. This, in turn, will affect vehicular traction, weight, top speed, and acceleration. Aside from the large motorized inventory to choose from, tailoring also allows for player handicapping. In this way, a seasoned driver can balance his act against a newcomer by either dropping his engine power or giving his opponent an advantageous option like spiked tires on an icy surface.

You must now decide on the track design. This is where *Racing Destruction Set* really shines. Not only are there 50 different track layouts already stored on disk—enough to satiate even the most capricious driver's appetite—but there's also an option that allows you to design, erect, and save your own.

It's like having a bottomless box of those black-plastic grooved track sections you used to snap together to race your miniaturized slot cars. Curves, forks, crossovers and jumps are all available in a variety of heights and widths, with a choice of three surfaces: pavement, dirt, or ice. Create mud mountains or frozen molehills; drop down an asphalt drag strip or a sedimentary corkscrew. Make it as impossible or as accommodating as you wish. Then challenge it.



> *You can boot up* Racing Destruction Set *and play a different game every day for the next 82,489 years.*

If you would rather leave the roadway architecture to someone else, or if you're looking for a good source of inspiration, check out the diversified array of courses the Electronic Arts' designers have included with the program. Along with their original assortment of basic track styles, like Spiral, Dirt 8, Head-on and Supercross, there are also trials modeled after actual duels from the Gran Prix circuit, American roadrace courses, and famous test tracks. Even racing greenhorns will recognize some of these: Daytona, Watkins Glen, Indy, and Monaco.

But just because you are using a prefabricated track, don't think that you can't add your own personal touches. Before any race begins, the player must designate the number of laps and choose between three skill levels, four background designs, one- or two-player game, and 14 different gravity pulls.

It is here that you choose either a regular race or a destruction-style contest, where the goal isn't so much to finish the race, but to destroy your opponent before he destroys you. Steel armor, crusher plates, land mines, and oil slicks all help.

The screen graphics are arranged in a split-level, three-quarter format, with each car trailed from a vantage similar to the perspective made famous by *Zaxxon*. Each driver follows the events through a separate window, which displays his car in relation to the immediate surroundings. Although some may find the smaller visual range a bit limiting, this set-up negates the old problem which used to plague large-scale head-to-head computer racing games: the contest would be continuously interrupted whenever one player opened up a lead larger than the monitor's dimensions. This change makes more sense and works well in setting up a faster paced, more equitable match.

So for aspiring track designers, as well as hard core video racing fans, here's your ticket. Plenty of fast cars, gruelling tracks, high speed dramatics, and spectacular crashes. As far as entertainment longevity goes, as close as I can figure (with the help of my trusty pocket calculator), even *before* you select any track construction modes or vehicle modification options, you can boot up *Racing Destruction Set* and play a different game each and every day for the next 82,849 years.

My advice: Get started as soon as possible. C

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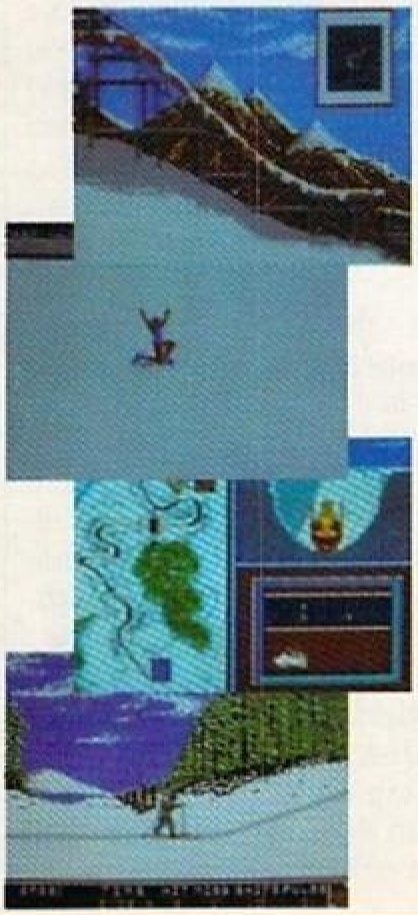

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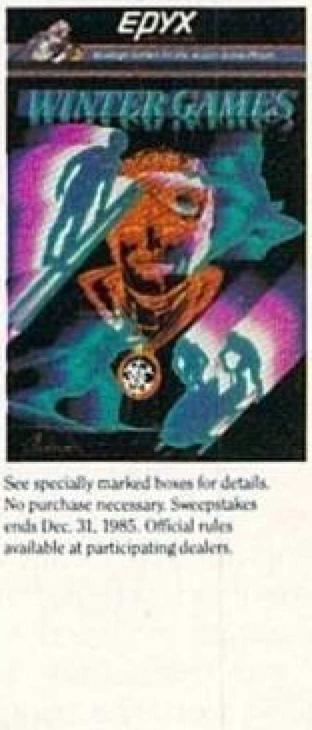
	APPLE	MAC	C64/128
Winter Games	✓	✓	✓



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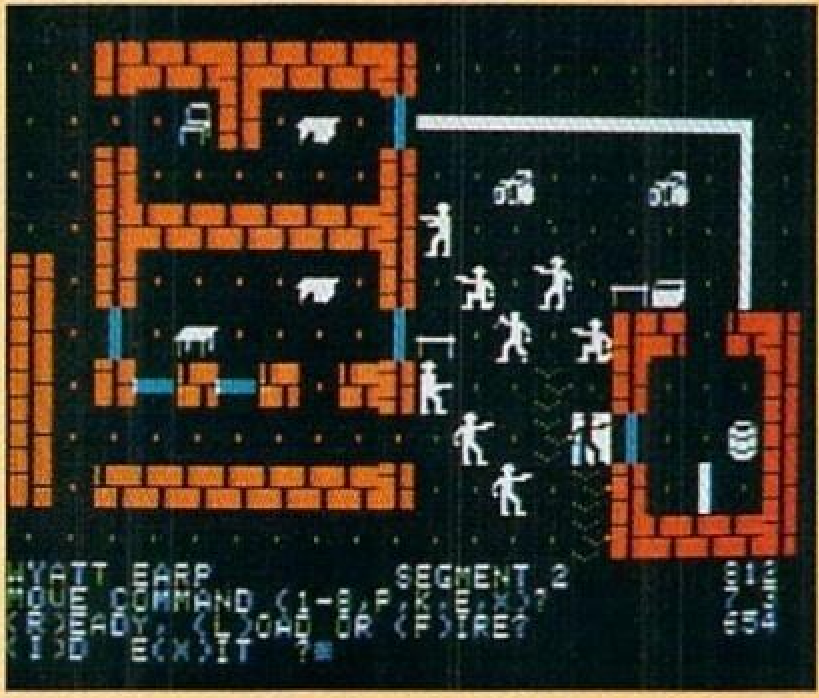
Strategy Games for the Action-Game Player®

REVIEWED BY RICK TEVERBAUGH

Six Gun Shootout

Computer: Commodore 64
Publisher: Strategic Simulations
883 Stierlin Road
Mountain View, CA 94043
Medium: Disk
Price: $39.95



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WYATT EARP                  SEGMENT 2
MOVE COMMAND (1-8,P,K,E,X)?
(R)EADY, (L)OAD OR (F)IRE?               654
(I)D   E(X)IT   ?
```

One outstanding feature of the game is the campaign option, in which you create a specific character.

If you're an old western film fan who envisions face-to-face confrontations with Billy the Kid or Jesse James, you'll enjoy *Six Gun Shootout*, a strategy game with a real feel for the Old West.

There are ten scenarios. Some are historical, like "Gunfight at the OK Corral," in which the Clantons match firepower and courage with the Earps and Doc Holliday. Then there are movie scenarios, like "The Good, the Bad, and the Ugly," in which Clint Eastwood and one ally take on five of filmdom's most gruesome villains. Finally, there are traditional confrontations, featuring Indians and settlers, complete with circled wagons.

Each of these scenarios comes with a full cast of characters. You can keep those characters as they are, or you can change them. To change them, have the computer randomly assign the character attributes or create one or more characters to your own specifications.

This method of assigning traits to your character is not much different from adventures featuring personalized characters. Each combatant is given ratings for movement, hand-to-hand combat, and ability to survive different types of wounds, along with ratings for speed and accuracy with weapons.

The movement rating and the speed of using a weapon will determine whether a player will get to move or shoot. Whether you hit a target depends upon several factors: whether you or the target are prone, kneeling or erect, the terrain, and the accuracy ratings of each player.

If all this sounds a bit complicated, don't fret. The computer handles all these calculations in a matter of seconds. All you need to do is pick what you'd like each character to do when it's his turn, and watch the action unfold.

The detailed screen layout is quite similar to that of Strategic Simulations' war games. It lets you tell at a glance the position of the character and whether he has a weapon drawn. Sound effects are minimal, which adds tension to the quiet before the storm.

Those who religiously watch the westerns on television or their large-screen counterparts will know that often as many as 12 shots can come from the same six-shooter. Don't try that here. There's nothing more embarrassing, and not to mention deadly, than to stare down the barrel of another man's gun, draw your weapon, and hear only the click of the hammer hitting an empty cylinder.

The game can be played in one- and two-player formats. The computer takes either the bad guys or the good guys. When playing against the computer, you can see only those men you would be able to see through the eyes of your characters. When two players are at the controls, one player must look away while the other is moving.

Chances of hitting a foe with one of the 18 weapons available are determined instantly by means of a complex formula that includes posture, terrain, range and wounds to the shooter. There are both minor and major wounds, and their cumulative effect has the final say in whether a character remains to fight some more or fades off into the sunset. One outstanding feature of the game is the campaign option, in which you create a specific character, assign his weapons and attributes, and then try to take him through all ten scenarios.

Movement is controlled by the keyboard. Each number (one through eight) represents a different direction in which a character can fire or move. One word of caution to the novice: When you have a choice of moving or firing, always choose to move, unless you're in a real position of strength. Chances to fire come up much more often than opportunities to run, and your fire power is limited.

Don't forget that you need to ready a weapon and have it loaded before you can fire it. From the keyboard you can also control the amount of delay in text messages. You can also see everything highlighted that is in a character's line of vision, and you can clear the map of all characters to view the terrain.

Above all, don't be intimidated. You can breeze through the 12 pages of thorough instructions and then be entertained by eight pages outlining what life for a gunfighter was like in the Wild Wild West. And you can always save the game at critical moments to try alternate solutions without losing the progress you've made.

Instead of just living the life of a gunfighter through the screen personae of John Wayne or Clint Eastwood, step right in and smell the gunpowder in *Six Gun Shootout*. ■

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REVIEWED BY MARK COTONE

Winter Games

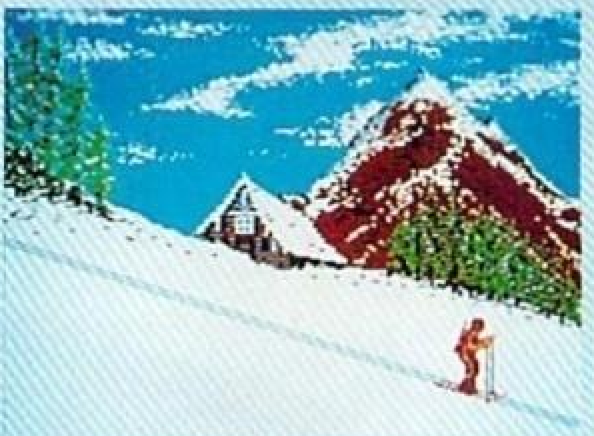
Computer: Commodore 64
Publisher: Epyx
1043 Kiel Court
Sunnyvale, CA 94089
Medium: Disk
Price: $29.99

Quicker than the actual change of seasons, Epyx has followed up their Summer Games II program with the release of a new frosty feast: *Winter Games.*

Drop that javelin and grab hold of a ski pole. Get off that bicycle and into a bobsled. Quick, pull that boat from the lake before it freezes. The rush for the cold gold is about to begin.

For all you anxious computer sports fanatics who have been part of Epyx's past Olympic-style trials, I'm happy to note that they did not let the drop in temperature cool down their solid and successful game plan. This is the tough, diversified challenge we have come to expect. The seven events will put your reflexes, timing, and eye-hand coordination to the test. You won't find a better joystick workout.

But this program's appeal is more than just quality game design. Its accurate depiction of this pageant's sights and sounds is real micro-artistry. The entire wintery atmosphere has been captured with unparalleled adeptness, providing an impressive audio/visual treat.



The seven events will put your reflexes, timing, and eye-hand coordination to the test. You won't find a better joystick workout.

The competitive drama, which is played in a variety of locations, opens on a snow-blanketed mountainside that will serve as the setting for three skiing events. At the base sits the biathlon course. Here, your athlete, outfitted with cross country skies and a 22-caliber rifle, must traverse a series of small hills and valleys to reach and shoot a number of stationed targets. It's a test of both speed and technique, for not only is a contestant out to beat the clock, but he is trying to do so without unnecessary exertion. You see, true to life, the onscreen surrogate's heart rate will accelerate with any added physical strain, making him unsteady and possibly inaccurate when firing. Pacing and rhythm are the keys to a cool hand.

Further up the slope are the "hot dog" trials, where the skiers spring from a small snow crest to display their adeptness in aerial gymnastics. The animation is smooth and convincing. Kicks, splits, and flips can all be performed, with a panel of judges scoring each attempt according to difficulty and execution.

Still higher we climb, near the snow-capped peak, where we await the most awe inspiring of all winter diversions: the ski jump. Controlling the skier's takeoff, landing, and inflight form, you vie for distance and style points. The designer's consistent attention to detail is especially evident in this event. The skier's moves and positions are realistically defined, as he springs from the starting house, skims down the ramp in a speed crouch, and uncoils into the openness at the end of the runway. (Miss this launching cue and you'll witness a variation of the familiar "agony of defeat" ski jump fiasco.)

The accompanying sounds help create an accurate environment. A quick-cut "s-s-s-s-t" signals departure from the tower, followed by a

Continued on page 126

Cold Gold Ski Tips and the Sledder's Edge

The instruction manual for *Winter Olympics* is uncharacteristically short on hints this time around, but perhaps I can provide a little coaching in some neglected areas.

Hot Dog Aerials

To complete the high scoring double movements, try to economize on time by holding your joystick in the initial maneuver position even before the skier starts downhill.

Also, when performing a single move, pause after you hit your jump before beginning your aerial acrobatics. You should still have plenty of time to complete the movement, and the judges love the slight delay.

Ski Jump

When you launch from the tower, push your joystick to the right. This will put your skier in the most favorable "fault" position—one that is aerodynamic and easy to correct (just a joystick tap to the left).

Also, don't over-compensate for errors in form. You'll just move from one fault to another. Instead, lightly tap your controller to move your skier into the desired soaring position.

Biathalon

This event is run on three types of snow-covered terrain, each requiring a specific skiing style. The downhill uses the two pole thrust, the uphill uses a quick left-right motion, while the level ground is best traversed with slow rhythmic steps. Learn the course, know what's coming, and, most importantly, practice smooth transitions between screens.

Bobsled

The quickest route to the bottom is the straightest. Don't climb high on the banks, and don't over-react as you enter and exit turns. Any movement which causes you to move onto either wall is time consuming.

And remember—don't use the brakes. C

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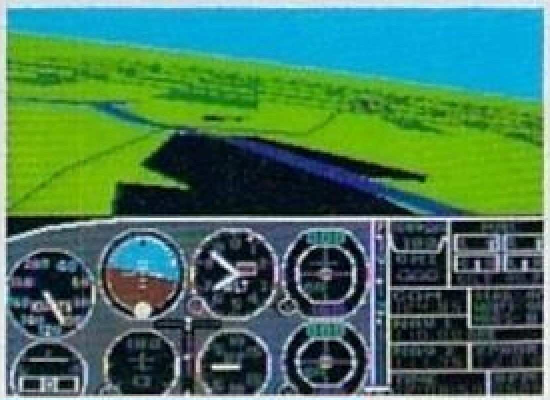

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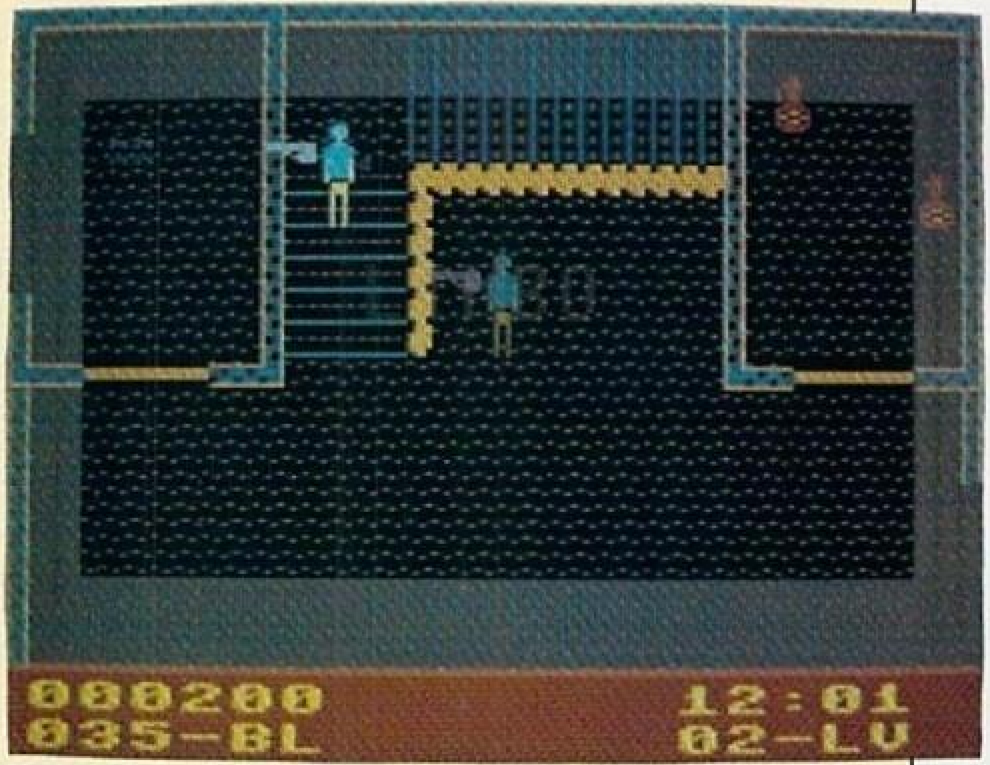
REVIEWED BY JEFF SEIKEN

Maxwell Manor

Computer: Commodore 64
Publisher: Avalon Hill
Microcomputer Games
4517 Harford Road
Baltimore, MD 21214
Medium: Disk
Price: $25.00

Maxwell Manor *makes your average haunted house seem like a rest home.*



First, you should know that Maxwell is dead. Though his soul has presumably departed to a more peaceful place, his skull lives on, inhabiting some dark, nearly inaccessible room within the manor. What manor? Why, Maxwell Manor, of course. And the task of locating the skull and ending its evil dominion over the manor has fallen to one Professor Arabesque.

This is the premise behind *Maxwell Manor*. The game opens with Professor Arabesque, whose actions you control with the joystick, standing outside the manor gates. The professor starts with a pistol and a limited number of bullets. In the course of his investigations, he will likely acquire an assortment of other useful items, such as a cross or magical coin, which are crucial to his survival. Also scattered around the mansion are numerous magical vases which supply extra bullets and extra lives.

The manor itself consists of two levels—the main floor and the cellar—plus the surrounding grounds. In terms of danger, *Maxwell Manor* makes your average haunted house seem like a rest home. Not only must you overcome a variety of deadly traps and solve puzzles, but the area is infested by an ensemble of voracious creatures—and the professor would make a perfect meal. The worst of these is the vampire spider, which can pin Professor Arabesque in its sticky web.

Maxwell Manor includes 100 possible variations. The variations change the layout of key rooms and treasures, and affect how the creatures and traps in the manor will respond to Professor Arabesque's intrusion. Thus, when stepping through an outside window, the professor might find himself in a maze of halls one time, and tumbling into a pool of bubbling oil the next. Each variation also has ten skill settings, so in all, there are 1,000 different game possibilities.

Before doling out tips on strategy, I should add a few words about the documentation. The game comes with a single sheet of instructions and a three-part hint booklet. The first part of the hint book amplifies the game instructions and is written in typical "adventurese." In other words, the tips are generally vague and circumspect. The last section, in turn, translates the first part into plain English, a courtesy which anyone who has ever wrestled with obscure documentation will appreciate. Although I must admit that after reading the third part, I still had as much trouble in the mansion as ever, at least the professor could act a little more resourcefully before getting killed.

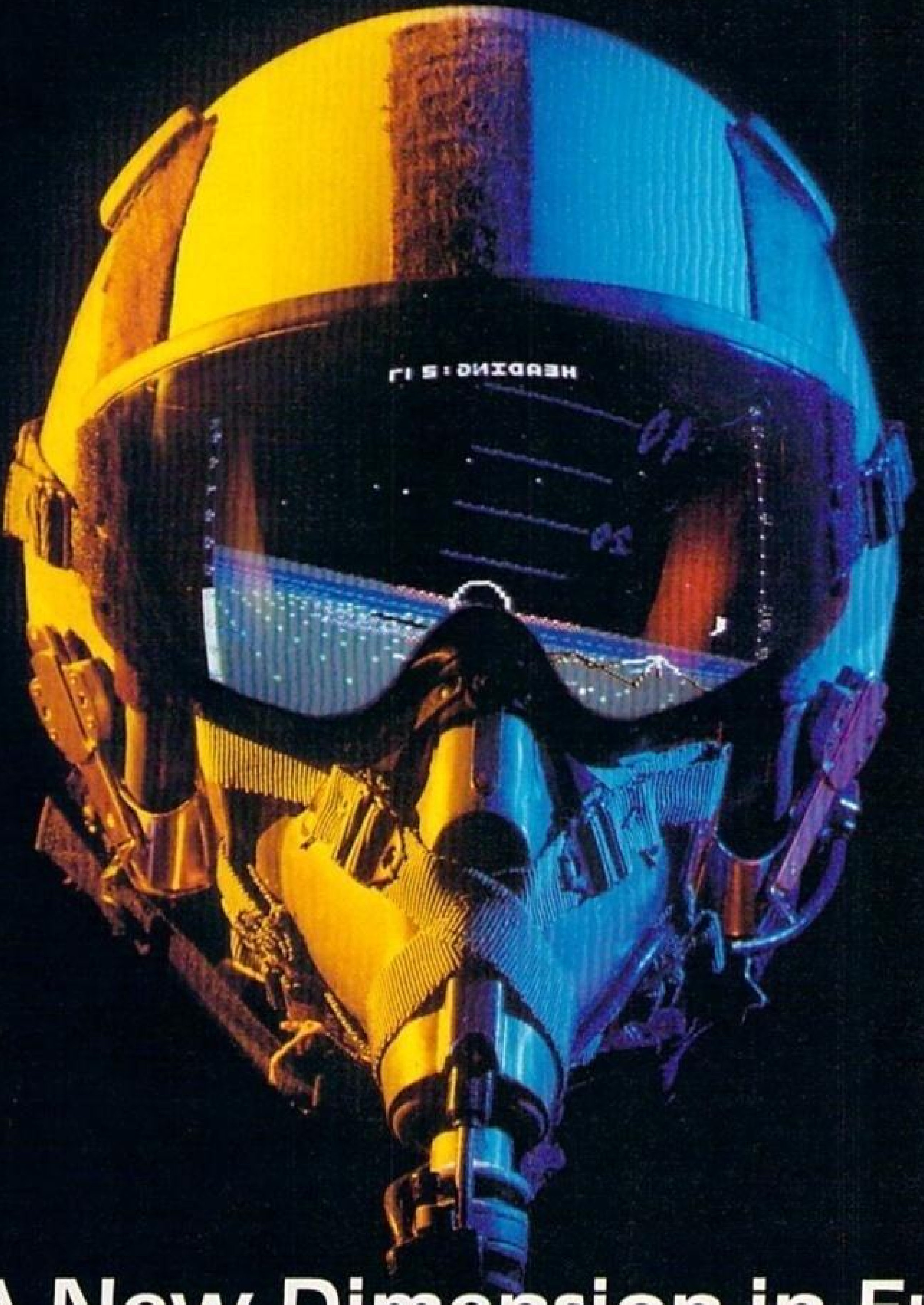
Despite the pistol that Professor Arabesque is armed with, *Maxwell Manor* tests not so much your shooting skill as your ability to maneuver. Any monster can usually be avoided by simple movement, except for the spider. Therefore, you may want to hold the cross and carry the pistol in reserve for special occasions. The key to a successful jaunt throughout the manor, however, requires mastering the art of jumping. In the most difficult rooms, the professor will have to cross small chasms or hop from foothold to foothold, so a talent for leaping through the air is a necessity.

For the most part, perfecting the professor's jump technique is mostly trial and error, but a few general tips may prove helpful. Do not push the joystick straight upwards, as this will achieve height but no distance. Jerking the joystick at an angle works best, although the exact angle to use must be left to your own discovery. Also, for jumps that involve possibly fatal falls (and not all of them do), keep a tight grip on the coin and be ready to use it. Finally, a running start sometimes helps.

The graphics in *Maxwell Manor* are clear and colorful, though occasionally lacking in flair. The monsters, however, constitute the one disappointing feature of the game. With the exception of the vampire spider, the creatures appear on the screen as little blobs of color, and their names—Glurks, Spriggles, and Wigglers—while perhaps appropriate for a Dr. Seuss book, seem juvenile in this context. A more distinctive set of creatures to complement the vampire spider would have certainly added a greater sense of menace.

While I would not call *Maxwell Manor* the last word in adventure/arcade games, it is still quite fun to play. The game tests your reflexes and, yes, even your wits to some degree. So go ahead and take your first step through the gates of the manor. You might just find yourself becoming a regular houseguest. C

Jet



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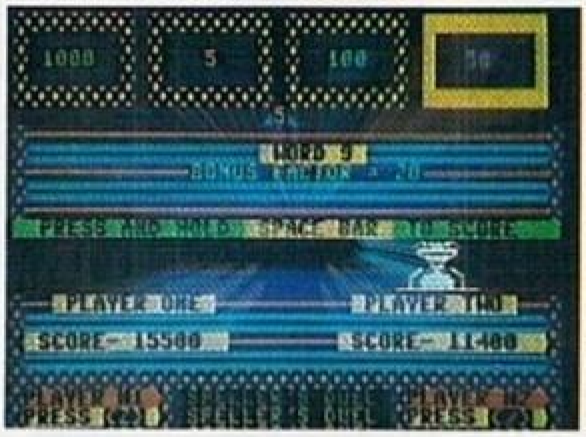
REVIEWED BY CHRISTINE ADAMEC

Speller's Duel

Computer: Commodore 64
Publisher: J. M. Pizzuti
P.O. Box 1077
Soquel, CA 95073
Medium: Disk
Price: $26.95



Whether your children are current spelling bee champs or they're struggling to learn their words, educators and parents alike will appreciate *Speller's Duel*, a game that incorporates learning with the fun of a quiz show.

In *Speller's Duel*, you first select words from the fifth- to eighth-grade level, or opt to create your own to save to disk. You can create up to 20 new word lists.

The fifth-grade list includes such words as "disguise" and "restaurant." The seventh-grade words range from "gourmet" to "nervousness." And then there's the Challenge words, which are really tough—"effervescent" and "scintillate," for example. Most adults would have trouble defining those Super Challenge words, let alone spell them!

After you've selected your word list, you must choose the speed of the game, from normal to fast to super fast. Before starting the game, you can review your word list. Check it over carefully, then move on to the game.

How do you play? Letters of the word will be individually revealed in a block at the top of the screen. Whoever recognizes a word from their list first will press the letter "Z" or the slash key and then type the word in. But don't wait too long, the clock is running. The normal speed gives you about 30 seconds to type your word. Spell the word right and you'll see "CORRECT" flash on and off. Spell it wrong, and the screen will display the right spelling over your misspelled word.

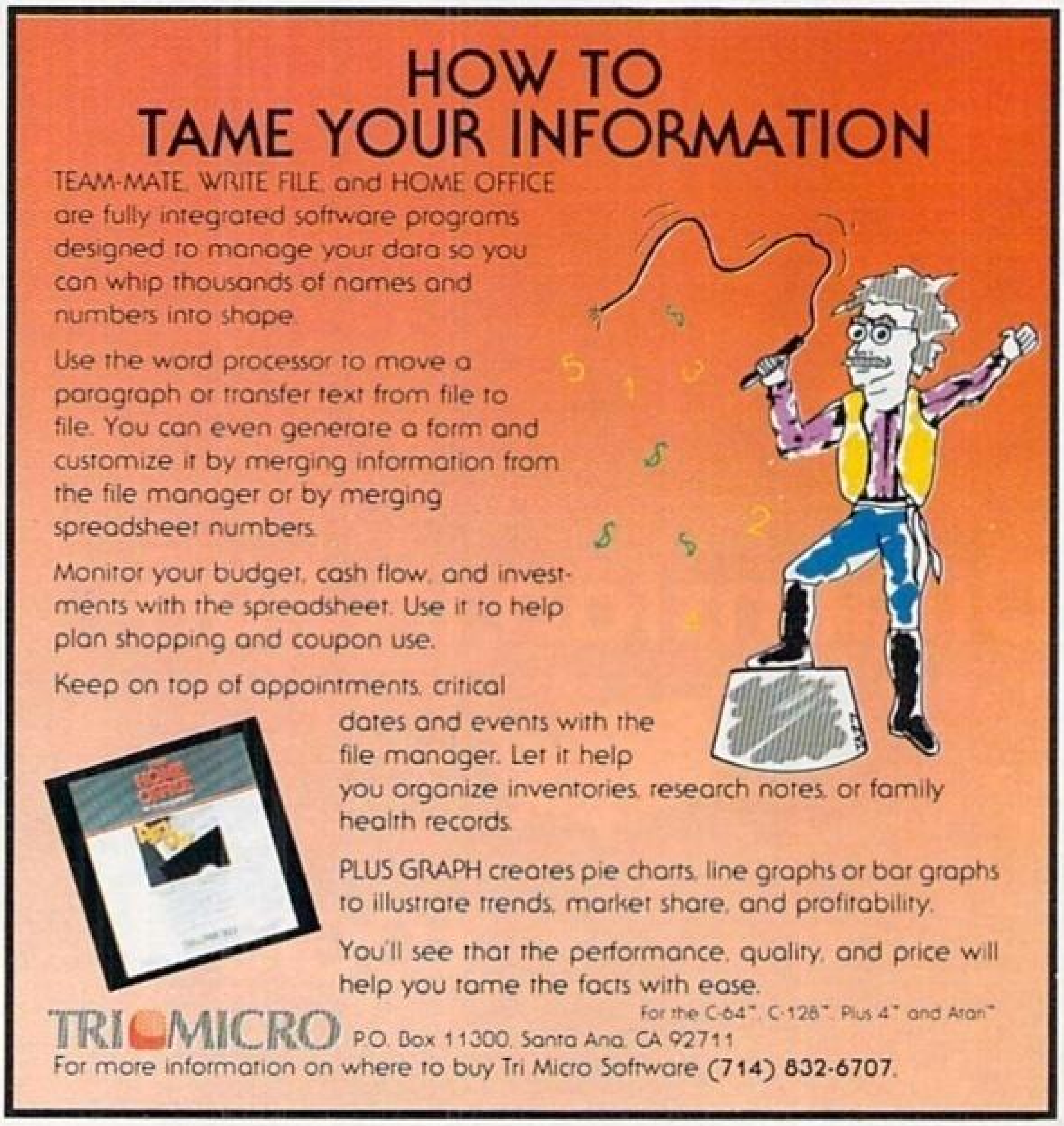
Numbers flash randomly throughout four blocks on the top of the screen. One block may at first show five points, then suddenly show 1,000 points. You press the space bar as soon as you think the largest bonus point box is flashing. This part is fun and encourages rapid reflexes, but remember: If you've previously spelled the word wrong, you won't get to earn those bonus points.

Speller's Duel was designed for children ages ten and up, but could also be used for younger children using easier word lists that you input yourself. One caution with younger children, though: A working knowledge of the keyboard is necessary because of the time limitation embedded into the game. My seven year-old son has used the 64 for several years and has no trouble immediately locating the right letter or number. But other seven and eight year-olds who don't know the keyboard may get frustrated.

Practice will quickly improve children's "keyboard literacy," and, as they become more skilled at both spelling and typing, they will be rewarded with a greater scoring potential on those bonus points.

Speller's Duel is a fast-moving game I recommend for both the school and the home. It is versatile enough for a home user, because you can always add new words. If the child becomes proficient at lower levels of words, he or she can always move up to harder ones. And because the rules of the game are easy to understand, and each game can be played in a relatively short time, *Speller's Duel* is a very good choice for the school as well.

Learning to spell is fun with the game-show format of *Speller's Duel*. With the help of this game, you may find yourself grooming the next spelling bee champ! ■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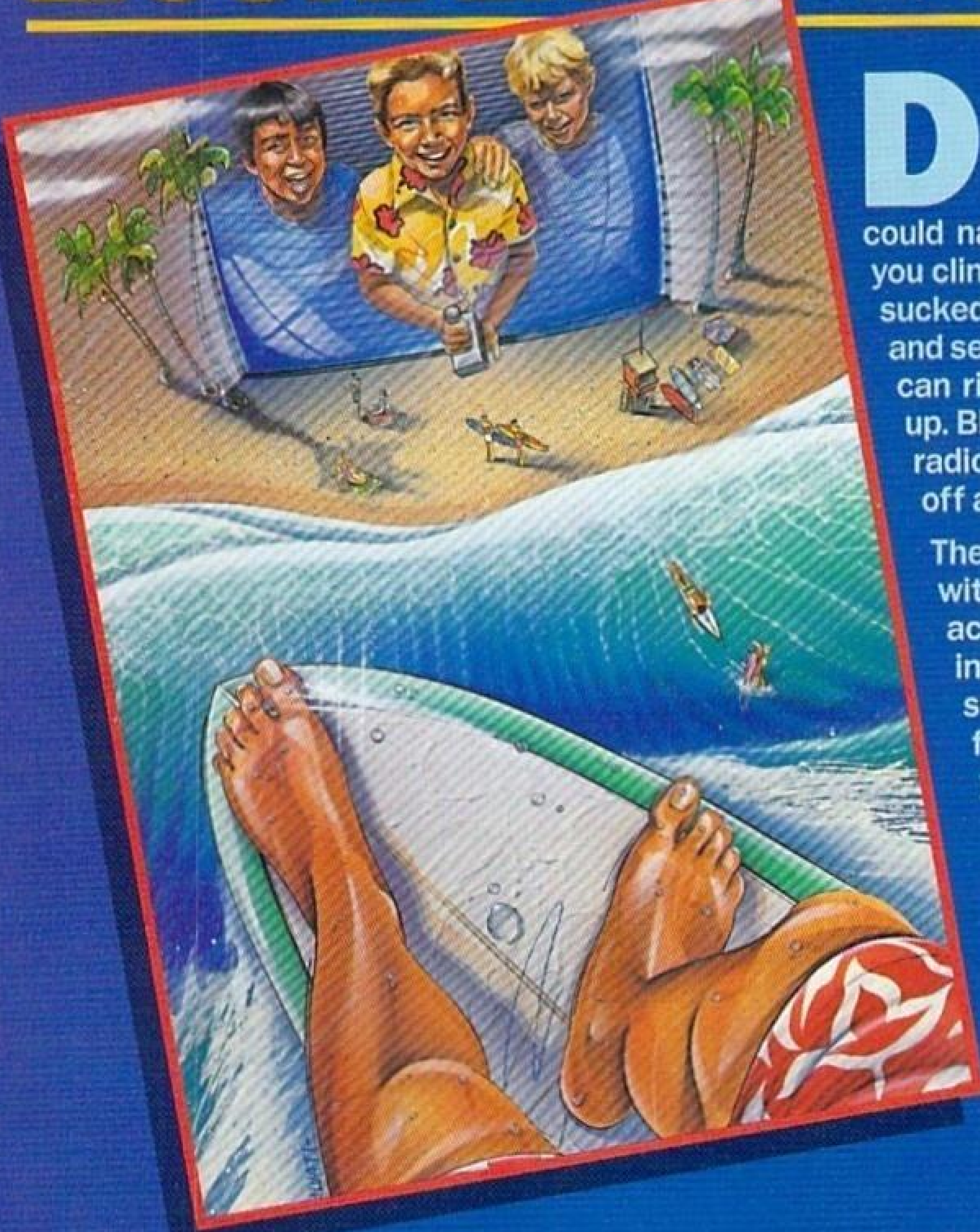

Driving down the face you crank into your bottom turn, maneuver your way around surfers paddling out, aware all the time of the lip that could nail you as surely as a glass axe. If you climb too high, you'll be pitched out or sucked over the falls. So you cutback hard and set up for the tube. See how deep you can ride before the barrel swallows you up. Blast off the lip! Hang Ten! Throw in a radical 360, or drive up the face to pull off an incredible aerial!

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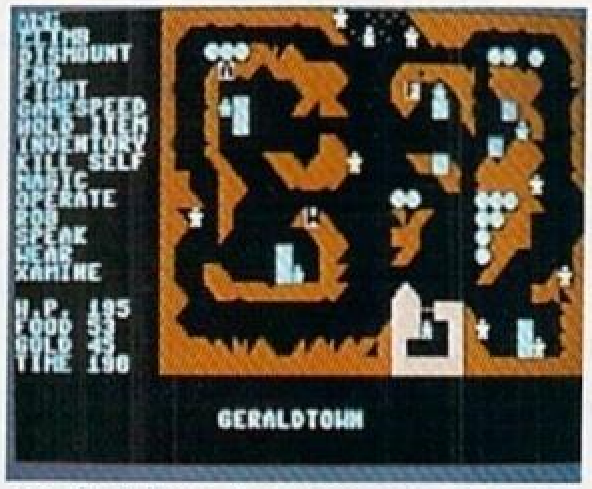
REVIEWED BY CHERYL PETERSON

Questron

Computer: Commodore 64
Publisher: Strategic Simulations
883 Stierlin Road
Mountain View, CA 94043
Medium: Disk
Price: $39.95

Questron is a strategy adventure game that will keep you busy for many, many hours. How many hours? Well, being about average as far as adventure gamers go, it took me weeks to finish the game. That's more than ten hours a day for at least ten days. Did I ever win? Yes! But it was an uphill battle all the way.

You are a serf from a small village who sets out to fulfill a prophecy: Defeat the mighty wizard who threatens to destroy all of Questron. Before you can defeat Mantor, however, you must increase your strength, quicken your reflexes, and learn to use magic. This is, of course, assuming that you can find him. Any weapons or armor will increase your chances of staying alive long enough to get to him.



You are not totally alone in your quest. The good wizard Mesron offers help, if you prove yourself worthy. There are three magicians who control the cathedrals, who can also help if they are so inclined. The king and his daughter also provide aid.

The cities and towns are populated by peasants and guards. Fortunately, there are also merchants who will be happy to trade your hard-won gold for their weapons, armor, transportation, food and magic spells. The towns may also have a gambling joint, jail or bank.

Along the way, numerous monsters and unfriendly people will try to end your quest. Besides the towns and countryside, there are dungeons and oceans to explore, too. It's not a bad idea to get more familiar with the king's castle, either.

Questron has some exciting features that really make it stand out. Besides the wonderful plot, there are arcade segments that give you a chance to test your reflexes and intelligence. The gambling games (double or nothing, roulette and blackjack) are a great touch. If you can't get enough gold by trouncing the monsters in the countryside, you can always try your luck against the games of chance.

A couple of hints for those who haven't tried this kind of game before. Talk to as many people as you can. They can give you good advice and hints that could save you later. Explore everything! Map the terrain; you may need to get somewhere in a hurry. Read the documentation carefully, because some good hints can be found there. Take your time. Like all games of this type, you can save your progress and resume the game later. Use this feature frequently.

The graphics are really nice, especially the scrolling countryside and the strange inhabitants. The sound is well done, too. The opening sequence song is a great little tune. I found myself humming it in the shower after a hard day's questing. The closing sequence has the most annoying warning alarm, but I think it's intended to unnerve you a bit. It really is hard to concentrate when the tone keeps getting more shrill with each passing minute.

As much as I enjoyed the game, it takes forever to load. And unfortunately, you can't walk away and get a drink or anything while it's loading, because it goes straight into the game and each turn is timed. You may come back to find you've missed 30 or 40 turns. In that time, you could be dead already.

Questron is an addicting game, and if you aren't careful, you'll find yourself missing sleep and meals to play it. So watch out!

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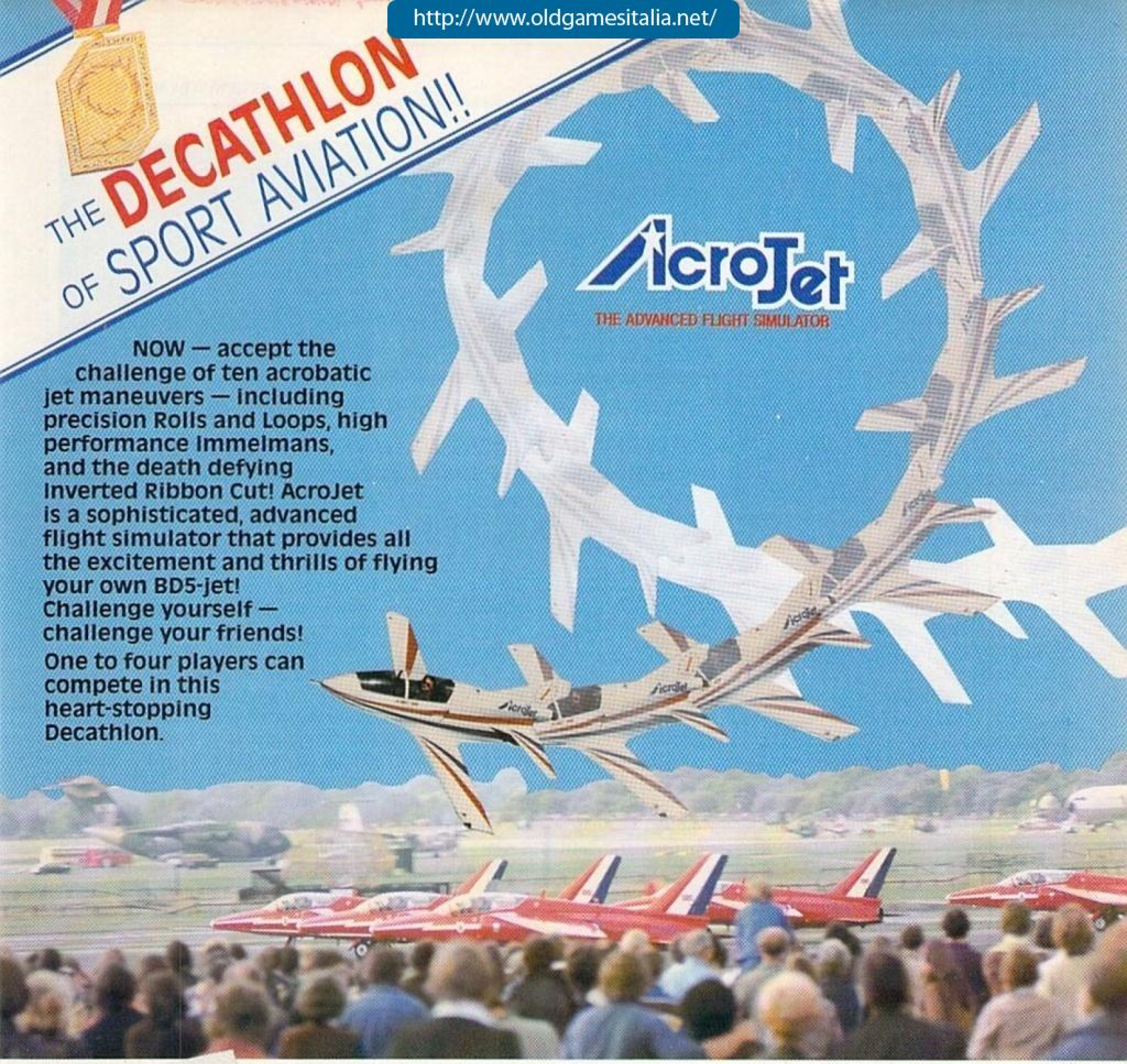

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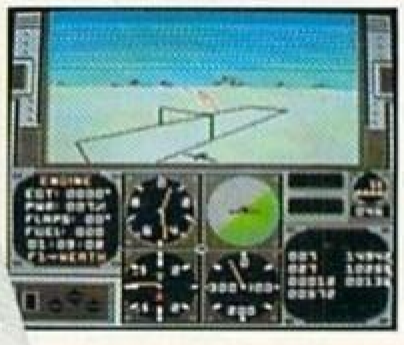

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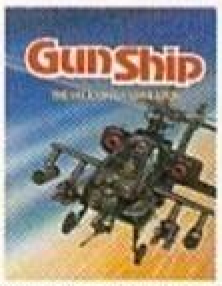

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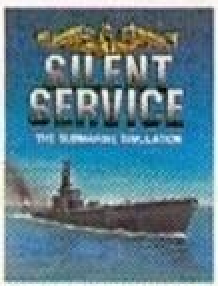
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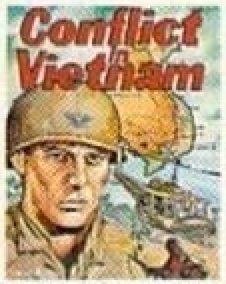
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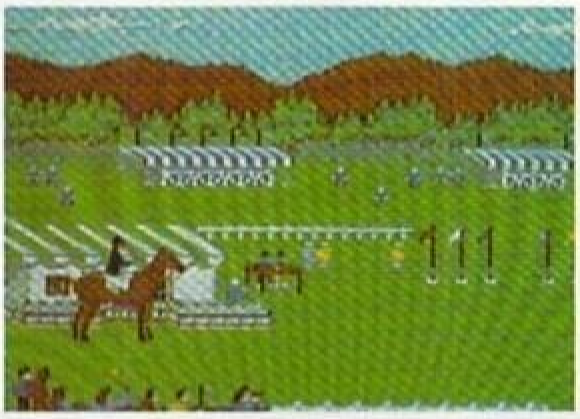
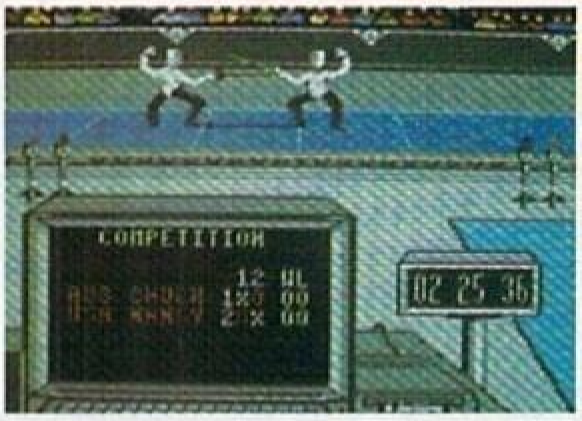
REVIEWED BY MARK COTONE

Summer Games II

Computer: Commodore 64
Publisher: Epyx
1043 Kiel Court
Sunnyvale, CA 94089
Medium: Disk
Price: $29.99





Summer Games II *is so diverse and demanding that it may redefine the armchair athlete.*

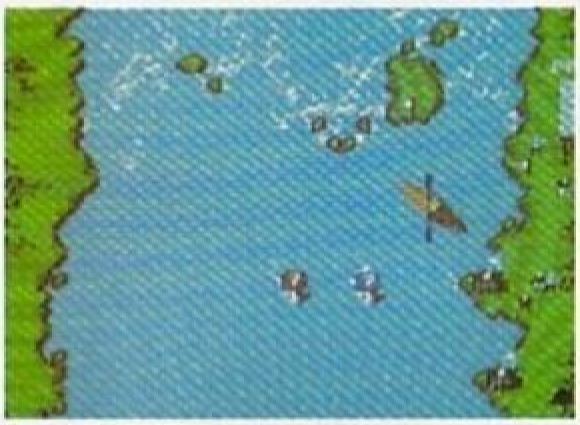
For the second consecutive year, the Olympics are back, once again captured with glorious pageantry in Epyx's *Summer Games II*. This contest complements its year-old forerunner by providing the most comprehensive computer sports collection to date, a series of trials so diverse and demanding that they may redefine the armchair athlete.

Signalled by the familiar theme song, the program commences with the ceremonial lighting of the Olympic flame and the simultaneous release of a flock of white doves. Then, with pomp and circumstance aside, up to eight players choose which of the 18 countries they would like to represent.

True to form, Epyx has packed this simulation with sporting variety. The well rounded line-up includes the triple jump, single scull rowing, the javelin, an equestrian test, the high jump, fencing, cycling, and kayaking.

Each event is visually exciting, with colorful graphics and fluid animation good enough to rival a Saturday-morning cartoon. Video athletes' movements realistically mirror the actions of a true contestant. Bikers' heads bob with each pump on the peddles; triple-jumpers crumble to the track when a miscue breaks their stride, then slowly rise from their knees with a disappointed hands-on-hips posture; and javelin throwers race down the runway and pull back with arched body, launching their spear skyward.

Even in a game like fencing, which uses a round-robin format that might place a contestant on the sidelines for a period of time, you'll find yourself just as enthralled as a spectator, watching the fencers parry and feint, framed by the backdrop of the attending crowd and a detailed lower screen scoreboard monitor.



All the while, these crisp visuals are heightened by accurate audio support: musical fanfare and stadium sounds that help sustain the realistic Olympic atmosphere. Oars splash, sneakers thump, and horses gallop, all amid cheering crowds. Not only does the crowd crescendo to a roar over an outstanding javelin toss, but they remain reverently silent during an artistic fencing exhibition.

You direct your athlete with a joystick. But the designers have avoided the infamous jerking action that has plagued similar contests, in which players are often required to repeatedly jiggle their stick to obtain optimum speed, height or distance. In addition to the pain and fatigue this has caused, players caught in the heat of battle often oscillate so violently that many a joystick has been trashed from misuse. Epyx has opted for more conservative controller actions, where strategy, execution and timing play a larger role than pure physical speed.

The events themselves can be run in either of two fashions: either a split-screen head-to-head setting or a solo turn-taking style. Your Commodore 64 will keep track of the medals and points awarded, tabulating and judging the athletes in each match as well as in overall placement. You can rearrange the order of challenges, compete in a limited number of events, or practice a single test to improve skill.

Even if you're the only one around, the computer will be happy to push you to the limit as a more-than-adequate opponent. But to experience the program's true competitive potential, try to get a crowd of human players together. The verbal and cerebral interplay that is stimulated by the constantly changing challenges, standings and match-ups is an unequalled catalyst for entertaining excitement. And if you already own the original *Summer Games* program, the two can be married to provide a full-scale marathon test of dexterity and endurance, all capped by an extravagant closing ceremony styled after the memorable Hollywood finale witnessed at the curtain call of the 1984 Olympics.

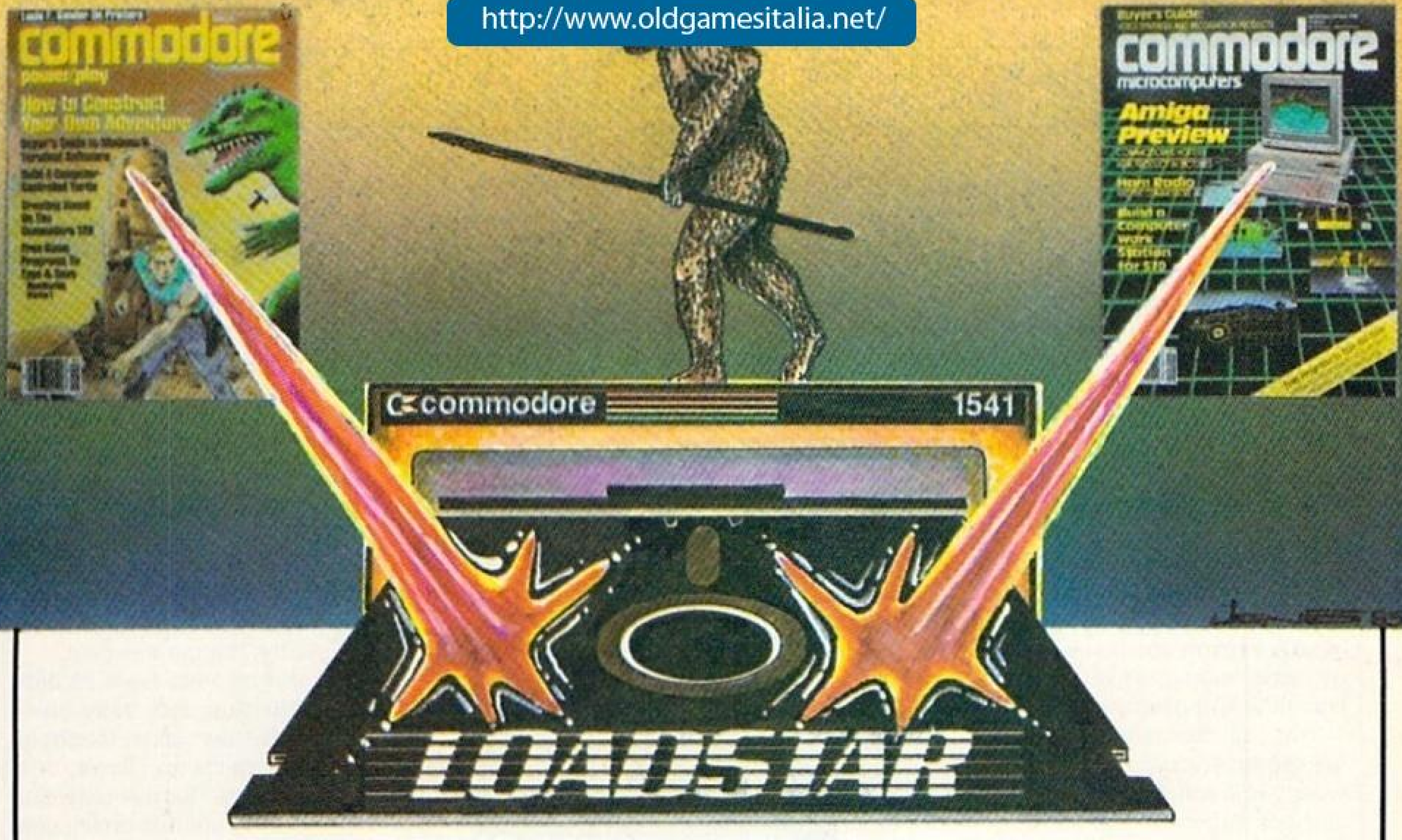
I urge you to slip into your sweatsuit, lace up your sneakers, and run right out to pick up this thoroughly enjoyable program. Then, let the games begin! ■

Gold Nuggets

It will come as no surprise to learn that the single most important element in a successful run for the gold is practice, and lots of it. Each event requires a different touch, and it will take some time before a string of medal-winning performances can be consistently achieved.

But that's not to say that any stra-

Continued on page 126



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REVIEWED BY GARY FIELDS

Combat Leader

Computer: Commodore 64
Publisher: Strategic Simulations
883 Stierlin Road
Mountain View, CA 94043
Medium: Disk
Price: $39.95

Combat Leader is unlike any other strategy game. It is complex, flexible, amazingly true to life, exciting and fast. The game simulates combat between tank and mechanized infantry on a scrolling battlefield. Opposing armies are made up of tank and infantry platoons, mortar squads, scouts, and anti-tank and machine gun squads.

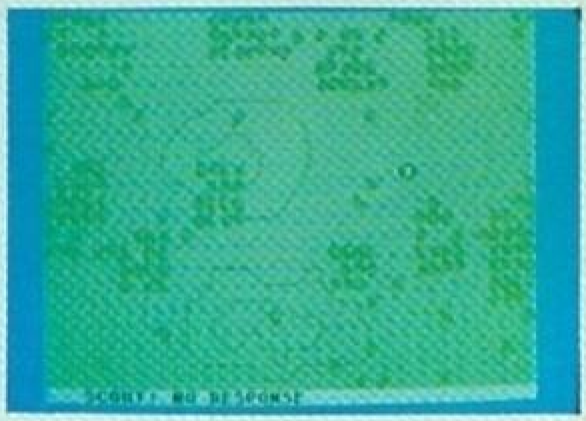
You, as commander, are given a helicopter's view of the battlefield, which is several screens in size. As you look "down" upon the battlefield, you see a realistic display of trees, hills, broken ground, tanks and infantry carriers. As you press the joystick, the screen will scroll, giving the illusion of flight.

Commands are issued via two-way radio. Communication with the troops is in real time. The screen display becomes a swarm of activity as dozens of units respond to your orders. Tanks rumble around obstacles and infantry advance slowly through the woods. Enemy and friendly troops alike struggle across rocky, broken ground or melt into the green of the forest.

Just because *Combat Leader* is complex doesn't mean it is difficult to play. Issuing orders is pretty straightforward. For instance, if you want Tank Platoon A to seize a hill, simply position the pointer (using a joystick) on that hill. Press the "A" key to ring up Tank Platoon A, and then press the "G" key to issue the "go to position" order. If you want Tank Platoon A to hurry, ring it up again by pressing "A" and then press "H" for hurry.

Combat Leader becomes involved because of the detail, size and individual control of the army units. This control is so true to life it's a bit uncanny. When you ring up a unit, it flashes on the screen, awaiting orders. If you order a tank to move north and to look for the enemy in the east, the tank will move north and rotate its turret to point east, where you told it to look.

> Combat Leader's *graphics and sound effects are amazingly accurate—right down to the destroyed tanks and carriers leaving piles of rubble on the battlefield.*



You can control the entire army or just a platoon. If you choose to command a single platoon, the computer will assume control of both your army and the enemy's. This option gives you a chance to get into the trenches and slug it out squad to squad.

This "switch command" option comes in handy when large battles involving dozens of units become confusing, as friendly and enemy troops tangle. By switching between supreme command and platoon commander, you can first establish the overall flow of the battle, then assume direct command of key units at critical times in the battle, and then, after the crisis passes, again take the reins of the entire army.

Flexibility is the feature which sets *Combat Leader* apart from other strategy games. Players with a wide range of skills can enjoy this game because of its different entry levels. Novice as well as intermediate and experienced players will find a challenge. The game includes seven separate games: Novice, Intermediate, Attack Enemy, Seize and Hold Position, Mobile Defense, Reconnaissance, and Build Your Own Game.

Build Your Own Game is perhaps the best option. Here you can create your own unique games by mixing the terrain and opposing forces yourself. First select the battlefield terrain: wooded areas, open spaces or rocky areas. Next, choose not only how many tanks, troop carriers and platoons will be involved, but the thickness of armor, accuracy of fire, and the speed of each.

Other options include scout platoons, speed of the game, and even one called "panic under fire." If the panic control is set at "yes," then units on both sides may panic when under heavy enemy fire, and turn and run, ignoring orders from their commander until the danger has past.

You can also try your hand at battles in varied terrain with more challenging odds. Battles can be fought in the desert, mountains and forest, or a mixture of the three. Battles between infantries, infantry against tanks, or a mixture of both are possible.

The result is versatility. Each player can design a game suited to his or her own specific interest. This ensures that *Combat Leader* will never become boring or repetitious.

But above all, *Combat Leader* is exciting and fast. The average game probably lasts under an hour. Because you have direct control over the smallest units of your army (two-men squads), it is easy to do some exciting things no other war games can do. For instance, the mortar squad will lob mortar rounds or smoke cover anywhere you choose.

The graphics and sound effects are amazingly accurate. Destroyed tanks and carriers leave piles of realistic rubble on the battlefield. The tanks even switch from cannon fire to machine gun fire when close to ground troops. Scout patrols will collect information on enemy activity and report back to you. Realistic ambushes and counterattacks are also possible.

There is only one feature of *Combat Leader* I would change. For the sake of realism, all units are camouflage green and as a result are very easy to lose in a forest. This makes keeping track of them extremely difficult.

Combat Leader is a game I highly recommend to both novice and pro wargamers alike. If I could own only one strategy game, this would be the one. ◼

(Hi. I'm from Baltimore. Where's the pharaoh?)

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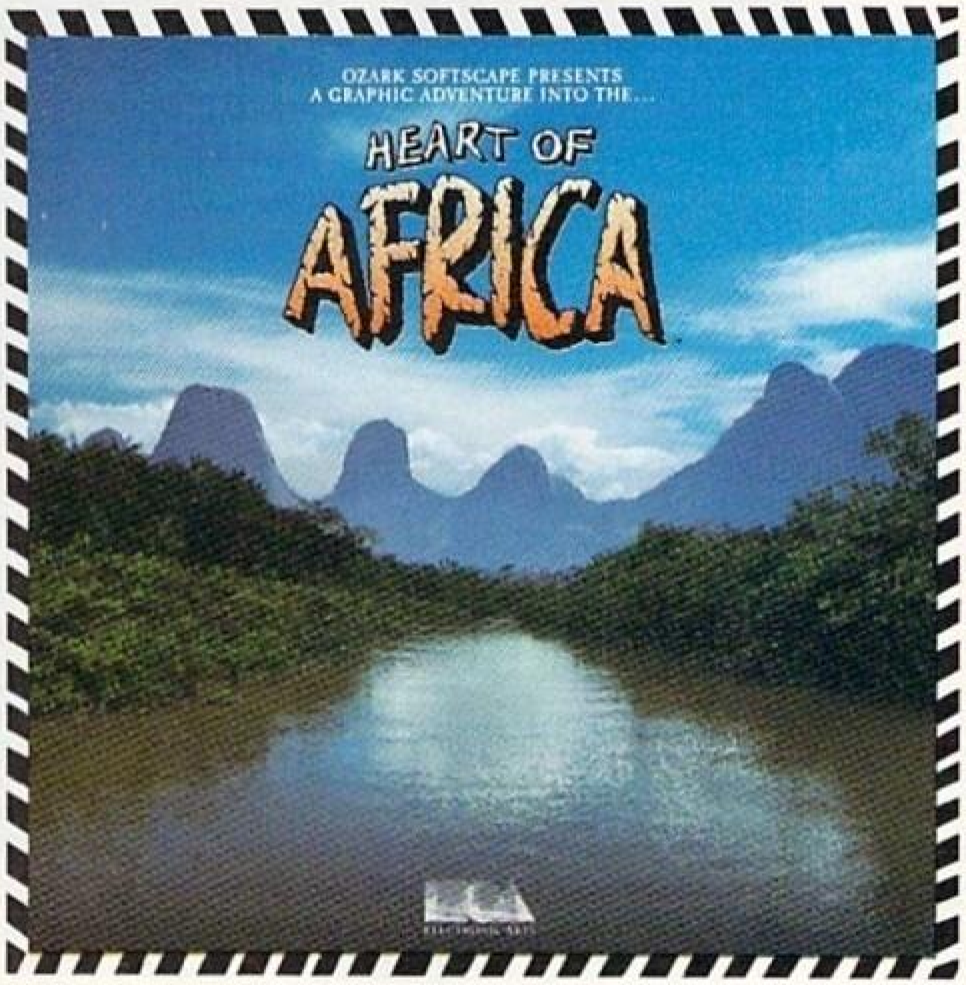

You have inherited a madman's diary …and his dream to find the tomb of an ancient pharaoh.

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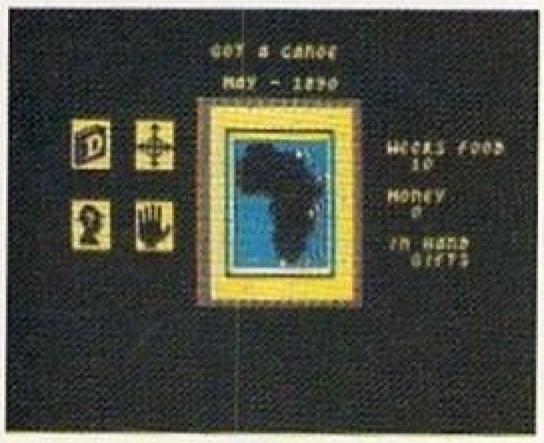

GOT A CANOE
MAY - 1890
WEEKS FOOD
10
MONEY
0
IN HAND
GIFTS

A Living Map of Africa

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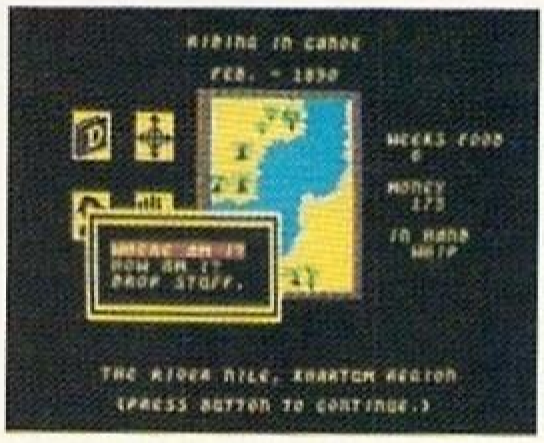

RIDING IN CANOE
FEB. - 1890
WEEKS FOOD
6
MONEY
175
IN HAND
WHIP
THE RIVER NILE, KHARTOUM REGION
(PRESS BUTTON TO CONTINUE.)

Follow Your Dreams

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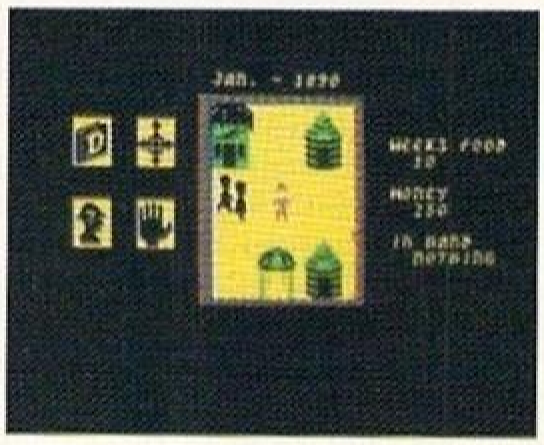

JAN. - 1890
WEEKS FOOD
10
MONEY
250
IN HAND
NOTHING

Decipher Native Clues

Local myths will help, if you can get the natives to talk. Enter their huts. Learn their customs. Pass out some bribes. The chief might tell you, "Look where the sun rises over the Childless Waters." Now try to figure it out.

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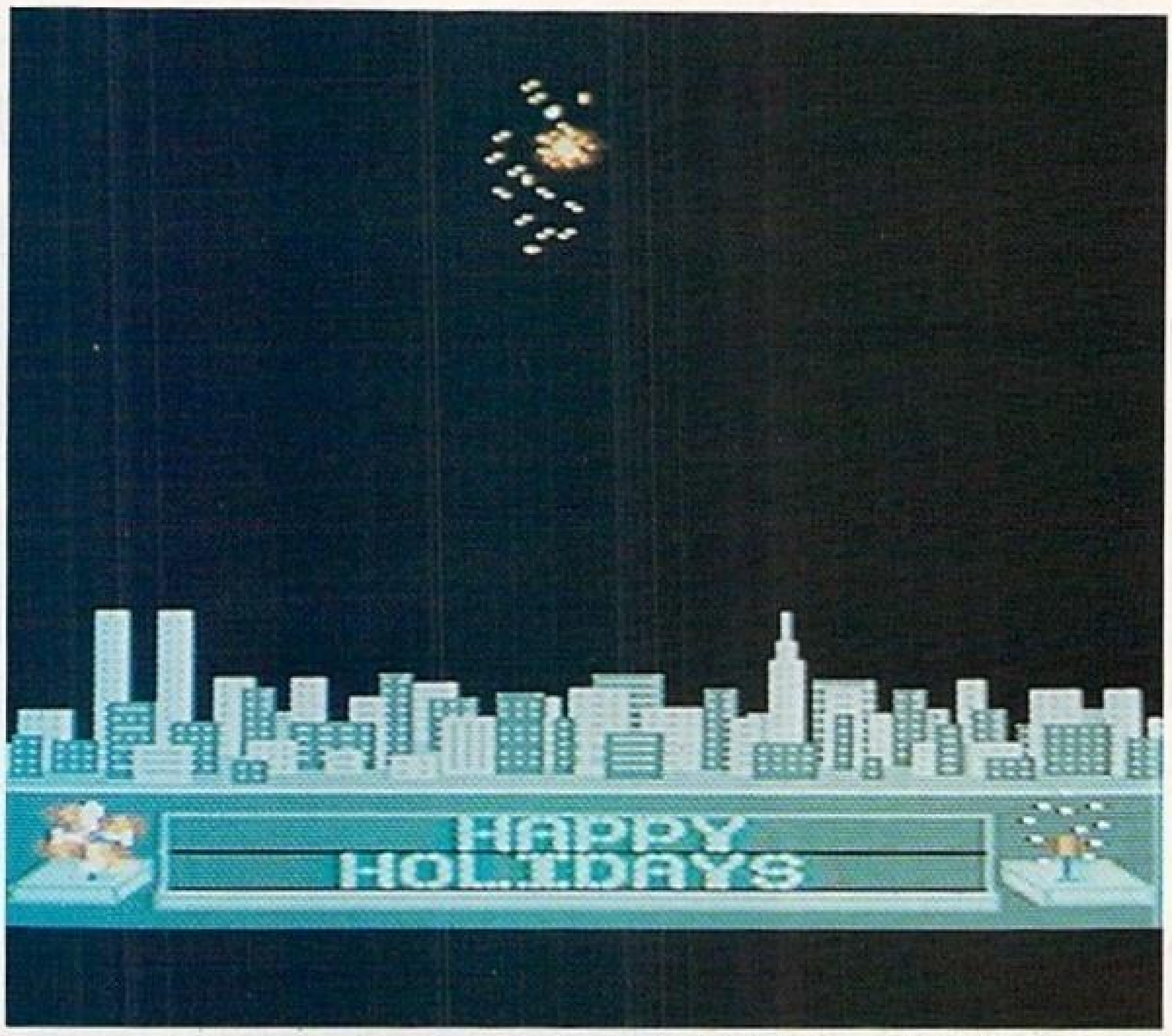
REVIEWED BY PAM HOROWITZ

Complete Computer Fireworks Celebration Kit



Computer: Commodore 64
Publisher: Activision
2350 Bayshore Frontage Road
Mountain View, CA 94043
Medium: Disk
Price: $29.99

There's no shortage of computer programs with great graphics, fast action, and built-in fun. Few, however, can be called inspirational. *The Complete Computer Fireworks Celebration Kit* is one of the few. This piece of software from Activision is a mind-blowing combo of spectacular fireworks and inspiring music—a computerized version of apple pie, motherhood, and the American flag. Dazzling rockets shoot up on the screen and explode in a burst of color to the accompaniment of patriotic Sousa marches.

As if all that weren't enough, *Computer Fireworks* is both fun and functional. You can create a synchronized fireworks extravaganza for yourself, or compose a personalized computer greeting card to send to a friend.

Computer Fireworks includes a library of pre-created fireworks displays to send on occasions such as birthdays, graduations, 4th of July, Christmas, and Father's Day. There are also get well wishes, a farewell, and a party invitation. Each display begins with a resounding fireworks show and appropriate background music. As the show continues, a scrolling message appears in text at the bottom of the screen. Customizing these explosive greetings is a great way to learn how the program works before attempting to create a show from scratch.

Computer Fireworks uses either keyboard or joystick control. A pointing hand allows you to move through several menus, making selections from the various icons. There are 25 types of fireworks, 6 background scenes, 7 holiday symbols, and 20 songs from which to choose. You can customize your display in hundreds of ways by mixing and matching the variables.

Create the ultimate fireworks display to share with a friend.

Using the pointer hand, you first scroll through the musical options to pick a tune. Next, you select the type of fireworks and color combination. A bar graph allows you to control the size of the explosion by how much you fill in the bar. The more the bar is filled, the bigger the explosion. You can even control the ember (length of the trail left by the explosion), as well as the height and positioning of the explosion on the screen.

Each variable has a numeric value, which can be used to create precision sequences. For example, you can adjust the values to make sure two displays will appear on the screen at exactly the same time, or synchronize the height of several simultaneous explosions. In addition, numeric values enable you to coordinate explosion times to coincide with certain points in your music.

The program moves easily between the SHOW and DESIGN screens, so you can create the show and then watch your efforts come to life in a spectacular display of sound, color, and flashing lights. Also, if you happen to own *The Music Studio*, also by Activision, you can use the music created by that program in your fireworks display.

Computer Fireworks comes with a blank disk and customized disk mailer for easy mailing to a friend. Another option allows you to turn your computer message into a video greeting by using a VCR to record it onto video tape.

Unlike the usual computer construction set, *Computer Fireworks* is a unique way to "reach out and touch someone." It's a new form of electronic expression that lets you create the ultimate fireworks display and then share it with a friend. Moreover, computer fireworks aren't dangerous or costly, and if your first try is a "dud," you simply go back to the DESIGN screen and try again!

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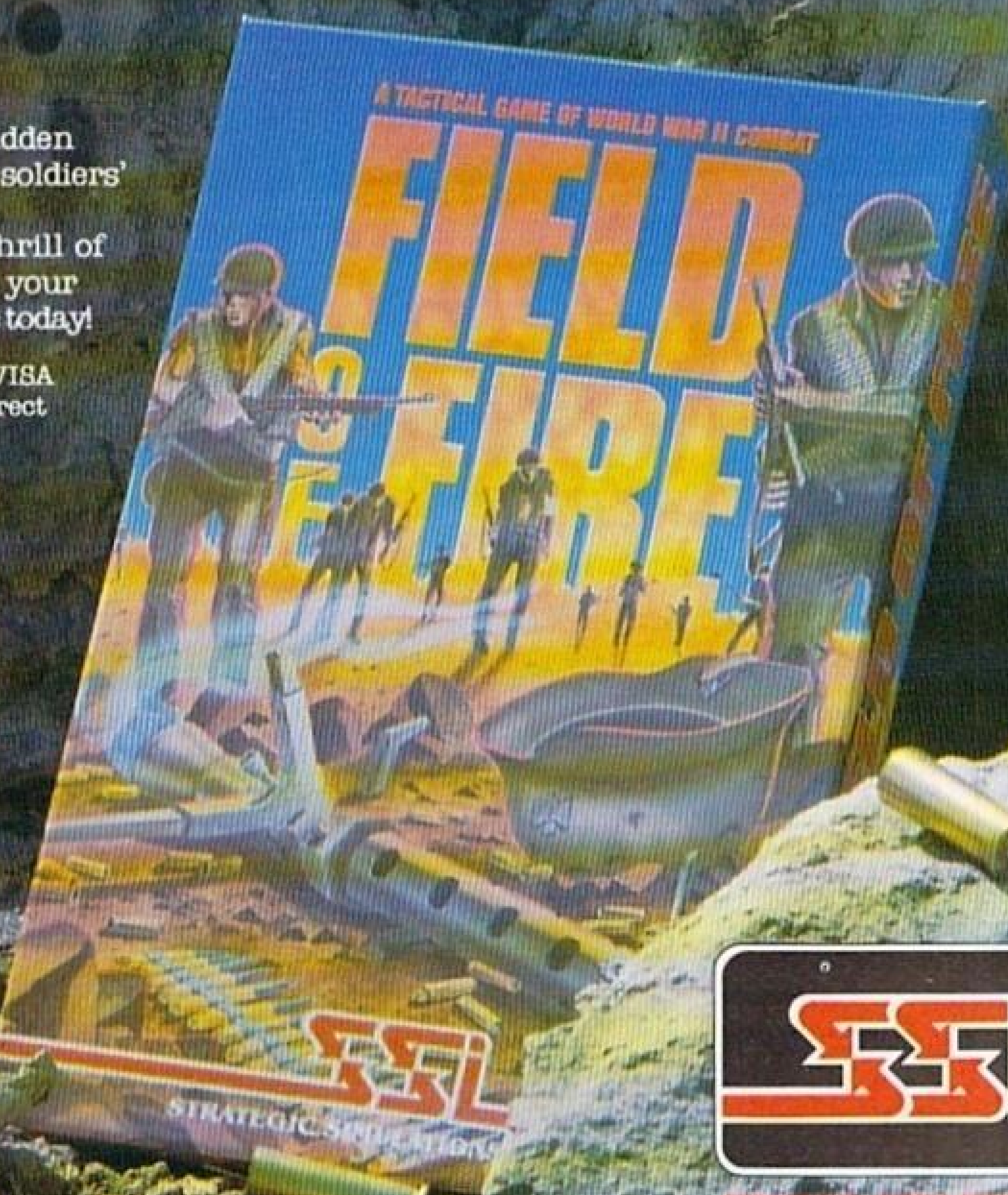

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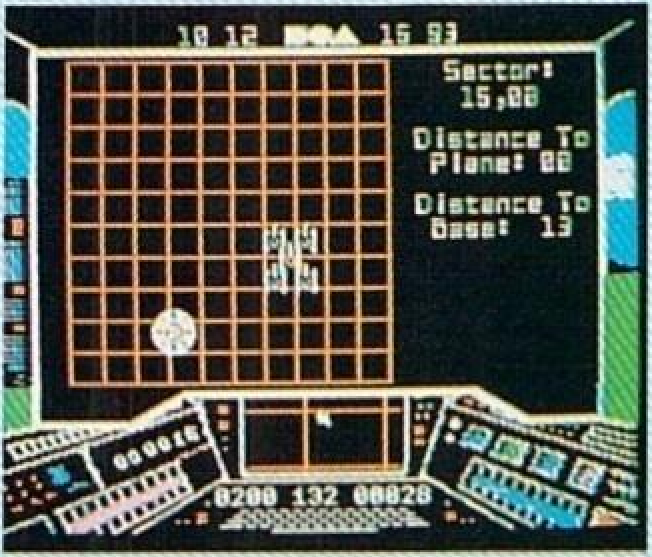
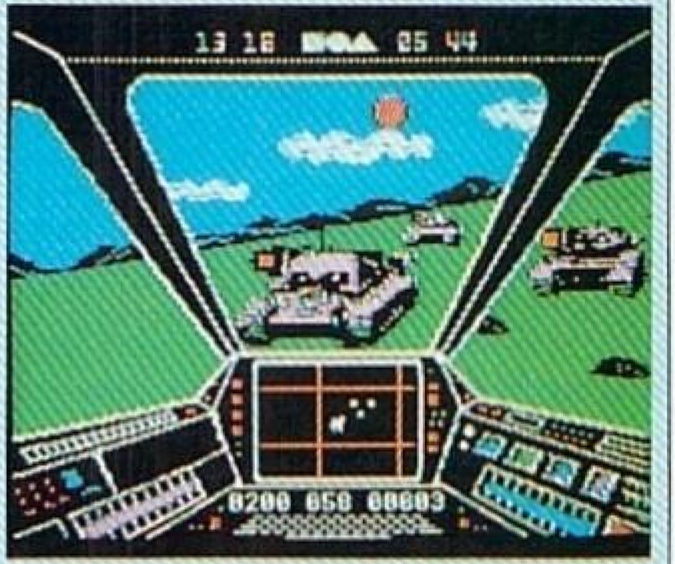
REVIEWED BY MARK COTONE

Skyfox

Computer: Commodore 64
Publisher: Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
Medium: Disk
Price: $34.99

Slide your chair close to the monitor, turn off all the lights, pop open a bottle of Dramamine, and get ready for an arcade-style wild ride through some of the unfriendliest skies you've ever encountered.





Even with its slight 16-inch wingspan, the Commodore 64 has offered countless opportunities for users to experience the sensation of computer flight. My personal disk hangar currently houses a Spitfire, a Piper Cherokee, a space shuttle, and enough starships to launch my own galactic armada. But the hottest craft to cross my tarmac in a long time is Electronic Arts' *Skyfox*—a mechanical pet so sleek, quick and responsive that it soars above and beyond the rest, leaving a vapor trail that cuts an unmistakable line between flight simulation and flight stimulation.

The physical construction of this fictive fighter, whether by choice or coincidence, is almost identical to the design of the vessel made famous by Clint Eastwood as Major Gant in the Firefox flick. Anyone familiar with the jet from that movie, which subdues an entire Russian Air force with a very convincing display of tactical efficiency, will be equally impressed with *Skyfox*'s performance. For this babe comes outfitted with enough strategic devices to make any armament freak drool with excitement. Check it out.

Flight speed: Zero to Mach 4 in four seconds, with nine intermittent

Skyfox Survival Tips

The only way to become a true ace of the base is with practice. After all, this is a piloting exercise, so you'll have to log your fair share of flight time to become comfortable with the controls and quick with the trigger. But the confrontations themselves do allow for some strategic planning, and the following tips might help you get off the ground.

Auto-pilot is a priceless weapon when you are trying to track enemy formations. It can quickly maneuver your jet to a predetermined coordinate, or can indiscriminately search out the nearest opposition grouping. In either case, the following precautions should be taken.

When using auto-pilot to guide your jet to a specific area, be careful not to plot your route anywhere near enemy forces. The opposing units are constantly in motion, and if you unintentionally cross their camp, your onboard computer will sense their presence, shut down your auto-pilot, and send you into an undesired battle. It's best to construct a path which entirely circumvents all possible combat centers, even if it means steering slightly off the most direct course.

When employing auto-pilot to simply relocate *Skyfox* to the nearest target center, take note of the axis coordinates which will momentarily flash on your radar screen as the device is put to task. Then, just before you reach this destination, switch back to manual pilot and take control of the jet. Otherwise, you might fall prey to auto-pilot's nasty habit of disengaging operation when you are sitting directly above your adversary, leaving you to absorb a few damaging jolts while you scramble for offensive positioning.

The documentation suggests the use of the forward radar scanner to determine enemy jet altitude in relation to your craft. It should be emphasized that this should be used only as a supplement to the overhead position—a far more practical viewpoint in any combat situation.

On opposing motherships: Unless your home base is in imminent danger from a tank or jet assault, the mothership should always be a primary target for early annihilation. This will cut off enemy reinforcements at the source. It should also be noted that, although these floating fortresses actually hover in the air, they are situated below the cloud cover, and can be reached only during a ground encounter. So, in a combination attack, it is often wiser to start your destruction on the ground.

speeds and a set of quick thrust afterburners at your fingertips. By the time you decide where you want to go, you're halfway there.

Guidance systems: Aside from a radar scanner display, which can toggle between overhead and forward screens for finding enemy locations, there is a host of futuristic aids available via a link with your powerful base computer. Tactical maps, installation status reports, detailed coordinate layouts, scoring summaries, and automatic pilot are all at your disposal and easily accessible.

Weapons: A continuous rapid-fire laser cannon flanked by an allotment of heat-seeking and radar-guided missiles sets the foundation for an awesome attack. And on the defensive, the Electronic Detection Arms Deflection Shields allow you to take a lickin' and keep on kickin'.

So what do you do with an aircraft jammed to the wings with all of this high-tech gadgetry? You do what every red-blooded fighter pilot has been trained to do. You fight.

Here's the motivation: You are a Federation flyer who has been urgently hurled into patrol duty by word of a nearby unprovoked enemy attack. Your mission is to protect your home base from infiltration, while searching for and destroying the opposing tanks and jets that have been launched from the bowels of your ultimate target, the mothership.

It's your basic, unabashed blast-or-be-blasted. But this same old story is transformed into something extraordinary by the skillful strokes we've come to expect from these Electronic Artists.

Looking over the high-resolution control panel of your *Skyfox*, you experience the sensation of flight, brought about by the impeccable blend of true first-person perspective and detailed, colorful graphics. The dimension illusion is two-fold. A realistic depiction of the cone-shaped nose of your jet gives depth to the instrument panel itself, seeming to jut the ship's tip a few feet into the screen. Add this to the accurate in-flight animation, and the stage is set. Slide your chair close to the monitor, turn off all the lights, pop open a bottle of Dramamine, and get ready for an arcade-style wild ride through some of the unfriendliest skies you've ever encountered.

The ground dips and pitches below as you put your plane through its paces. On land, you can see the formation of invading tanks change from mere blemishes on the horizon to full scale, detailed mechanical monsters on the prowl. Get a wide aerial view by climbing high, leveling, and attacking in a dive. Or tempt danger by skimming inches above the surface on a strafing run. In the air, enemy jets circle like buzzards, rocking your craft with a barrage of explosions as they zip about trying to gain advantageous positioning in some high speed do-or-die dog fights.

The visuals are certainly the star of this show, but they don't stand alone. Some solid play mechanics have been employed to back this program's eye appeal. You can select your challenge from 15 scenarios at five different skill levels. The skill levels adjust enemy speed and aggressiveness, while the scenario options let you choose the size and combination of tanks, planes, and motherships.

The first seven missions are training runs, designed to familiarize the player with antagonist tactics and *Skyfox* operations. Although there are a lot of on-board instruments to be monitored and implemented, they were intended to be game enhancements, not distractions. This game's forte is its fast and furious pace, so the craft is structured to be relatively easy to fly once the fundamentals are understood. These initial flights introduce different game elements without becoming burdensome.

The remaining tests are full blown enemy invasions, onslaughts that will challenge even the best pilot. These are the trials that will keep your jet junkyard filled with the scrapped wrecks from unsuccessful flights, failures that will only make you hungry for more.

Score another hit for Electronic Arts, who, as of late, seem to have the Midas touch in recreational programming. *Skyfox* has successfully rejuvenated the mindless destruction theme of the past by wrapping it in a state-of-the-art flight simulation. It's a contest whose action-packed game mechanics will take only a few minutes to pick up, but weeks to put down. C

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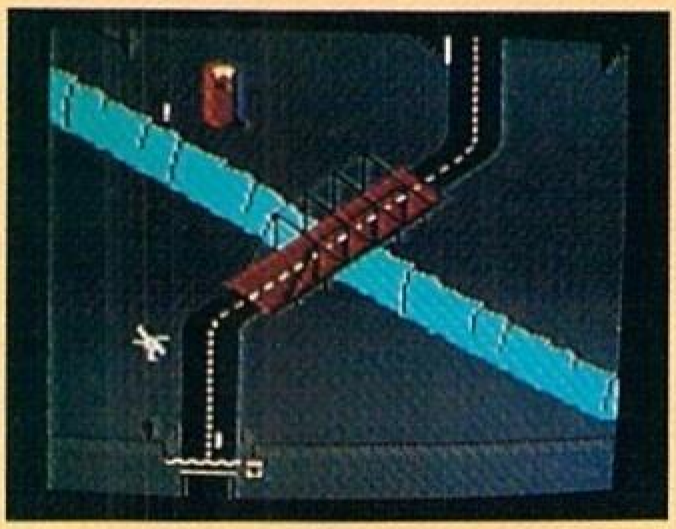
REVIEWED BY MARK COTONE

Beach-Head II

Computer: Commodore 64
Publisher: Access Software
3678 West 2100 South
Salt Lake City, UT 84120
Medium: Disk
Price $39.95

> Beach-Head II *delivers a challenge which is not only a respectable second chapter to the original* Beach-Head, *but a gratifying contest in its own right.*



The re-emergence of any enemy thought to be vanquished is usually no cause for celebration. But when the adversary is Access Software's notorious Dictator, and his resurrection brings the promise of another high caliber arcade-style challenge, then I raise my joystick high, and enthusiastically toast his return.

Those of you who were deft enough to have completed the final episode of the original *Beach-Head* hit will find that this subsequent contest only intensifies the power struggle. Closing the curtain on the initial program with the waving of a white flag of surrender, our infamous Dictator—now known by his code name Dragon—has feigned defeat and stalled just long enough to slip into the surrounding tropical forest and regroup his troops. And to make matters worse, you've just received communiques confirming that this power-crazed maniac also holds several of your soldiers hostage, hinging their fate upon your willingness to lay down your arms and surrender.

As a computer commander, you may have had better days, but never a better challenge. It's all part of *Beach-Head II*, "The Dictator Strikes Back," in which author Bruce Carver, this time teamed with brother Roger, delivers a multi-sequence action-packed sequel with all the graphic allure of its forerunner. Carver has embellished the sequel with some imaginative new play elements, and delivers a challenge which is not only a respectable second chapter, but a gratifying contest in its own right.

The game has been divided into four separate screens—a diverse string of trials, each with a totally unique look and goal, all tied together by the central "Dragon's revenge" theme. The drama unfolds with the Attack scene, in which a team of Allied paratroopers, using only a line of broken stone walls for cover, must traverse a stretch of perilous ground in an attempt to advance past the Dictator's prison guards and their machine guns.

If they are successful, the captives are freed and the action moves to the Rescue phase, where the Allies turn the tables by taking over the machine gun post, and use it to protect the liberated hostages who plod ever so slowly across an open courtyard toward freedom. The Dragon's men will deploy tanks and armored trucks, plant land mines, and even toss trash from the rooftops to intercept the escaping prisoners.

In the Escape sequence, it's back to the Allied helicopters in an effort to transport any emancipated soldiers to safety through a scrolling obstacle course of Dictator-controlled tanks, towers, blockade walls, and subterranean circular missiles. Only when past this final gauntlet are the Allied troops truly secure.

However, the most important battle has yet to be fought. For one man has stayed behind to complete a more personal mission. The hero is Allied Chief Commander, J.P. Stryker, the only one capable of confronting the Dragon alone. In this conclusive scene, called "Battle," these opposing leaders strip themselves of all heavy artillery and modern weapons, retreating to a sacred underground cave rumored to have once been used for native combat during ancient ritualistic ceremonies. Standing atop narrow wooden platforms situated on either side of a black river gorge, the two then duel using nothing but heavy sharpened sticks which are hurled like knives (poontas).

The whole project is a visual masterpiece, an artful blend of smooth animation and colorful three-dimensional graphics. But the Carvers can do more than paint pretty pictures. Their designing prowess is particularly evident in the structure of the two-player mode. It is a head-to-head bout with both combatants on the screen simultaneously—one representing the Allied forces, the other backing the Dictator. This creates enough game variables and options to keep any tactical mind busy.

There must be strategic awareness on both sides, going beyond simple eye-hand coordination, to play this game. Add this to the ever-changing environments created by players' offensive thrusts and counterattacks, and you see where forces and objectives might give you an exceptional mental workout. Victory will not only be the result of some fine-tuned joystick reflex action, but will also rely upon your ability to improvise against an unpredictable human opponent.

And to go along with this unique representation of computer combat is a feature that speaks for itself, literally. Through the work of Electronic Speech Systems, players get the chance to hear a host of simulated battle cries. The Dragon taunts his opponent, soldiers call for support and medical attention, and the mortally wounded go down with anguished blood-curdling screams. This voice reproduction adds a stimulating dimension that has only begun to be exploited. Access uses it well, if only superficially, to stimulate involve-

Continued on page 116

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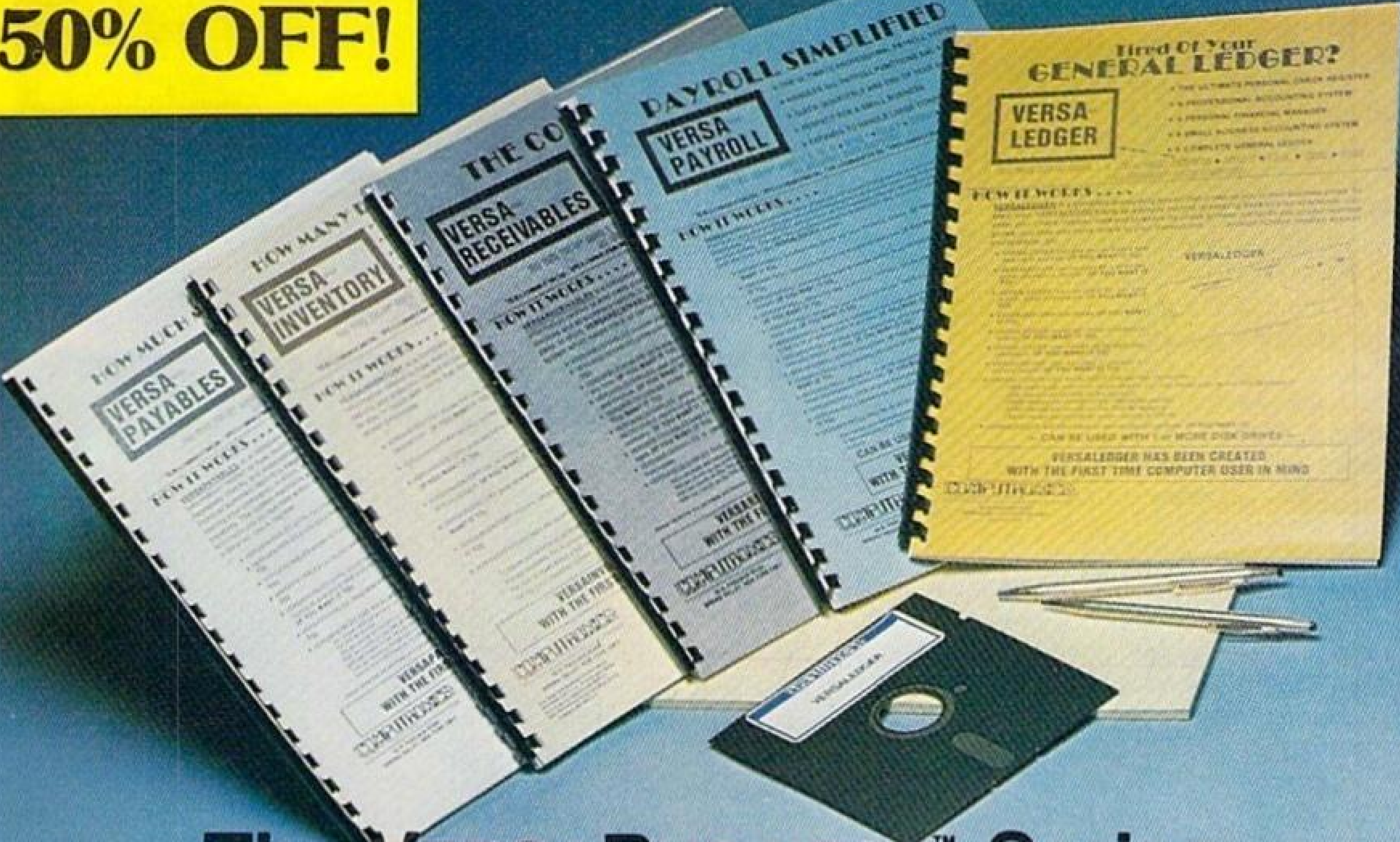

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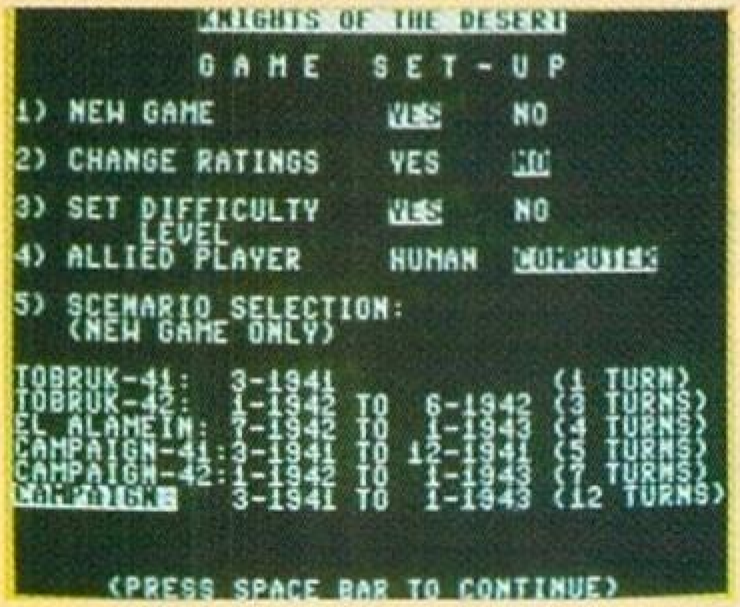
REVIEWED BY GARY FIELDS

Knights of the Desert

Computer: Commodore 64
Publisher: Strategic Simulations
883 Stierlin Road
Mountain View, CA 94043
Medium: Disk
Price: $39.95

Knights of the Desert *gives you the chance to match or surpass the efforts of both Germany's and Britain's best generals.*



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KNIGHTS OF THE DESERT

      G A M E   S E T - U P
1) NEW GAME              YES    NO
2) CHANGE RATINGS        YES    NO
3) SET DIFFICULTY        YES    NO
      LEVEL
4) ALLIED PLAYER         HUMAN  COMPUTER
5) SCENARIO SELECTION:
   (NEW GAME ONLY)
TOBRUK-41:    3-1941               (1 TURN)
TOBRUK-42:    1-1942 TO  6-1942    (3 TURNS)
EL ALAMEIN:   7-1942 TO  1-1943    (4 TURNS)
CAMPAIGN-41:  3-1941 TO 12-1941    (5 TURNS)
CAMPAIGN-42:  1-1942 TO  1-1943    (7 TURNS)
CAMPAIGN:     3-1941 TO  1-1943    (12 TURNS)

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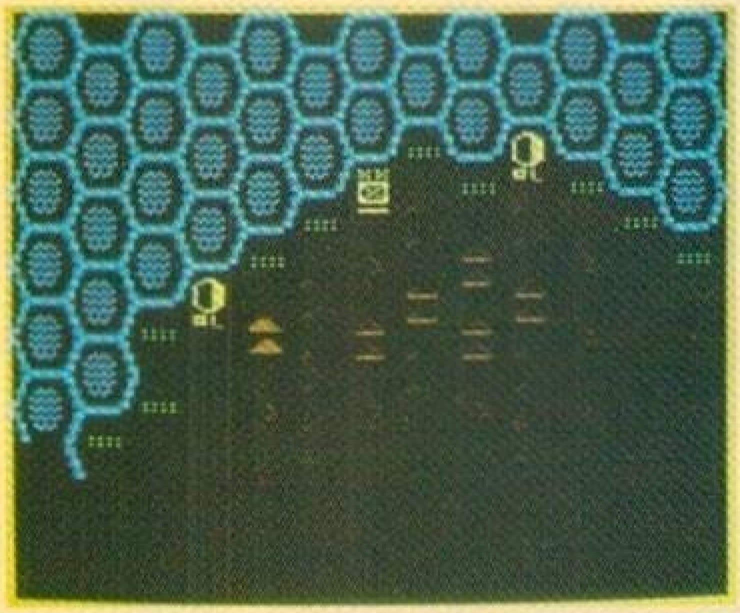


Knights of the Desert recreates the battles in North Africa that made Germany's Field Marshal Rommel and Britain's General Montgomery famous. The generals' armies, the terrain they fought for, and the logistic problems each faced are simulated in detail. *Knights of the Desert* gives you the chance to match or surpass the efforts of both Germany's and Britain's best generals.

Welcome to North Africa. The year is 1941, the place is the battlefields north of El Agheila on the coast of Libya. You are the new commander of the Afrika Korps, a step-in for Field Marshal Rommel. Your objective is to seize Tobruk and destroy the British army's supply port at Alexandria.

Two routes lead to Tobruk. One is a long coastal road through the fortified city of Benghazi. A more direct route is across the desert. Plan carefully though—the one you choose may seal your fate. Your only allies are speed and surprise.

Success hinges on careful planning and masterful handling of your troops. As in real life, paperwork comes first. Before you dash off to battle, you must organize, gather supplies, and give battle orders to your troops. Keeping your troops supplied becomes a major concern as soon as you leave El Agheila. With good supplies, your troop's morale will be high and they will be ready for battle. Without supplies, your troops will surrender, tanks will be reduced to mere metal targets glued to the desert floor, and defeat will be as certain as the North African sun.

Supply depots are lifelines and must be protected at all cost. German players must be on guard against raids by the British "desert rats," who strike and then disappear into the sands. The British must concentrate on protecting their long supply line stretching from Tobruk and westward to Alexandria.

There is a battle confrontation each time opposing units come into contact. The only sure way to win a battle is to overpower the opponent. If you can sucker an individual unit into an exposed position and attack it, there is a good chance of destroying the unit. The trick is to not expose yourself to similar treatment. Timely, carefully balanced attacks and counterattacks spell the difference between victory and defeat.

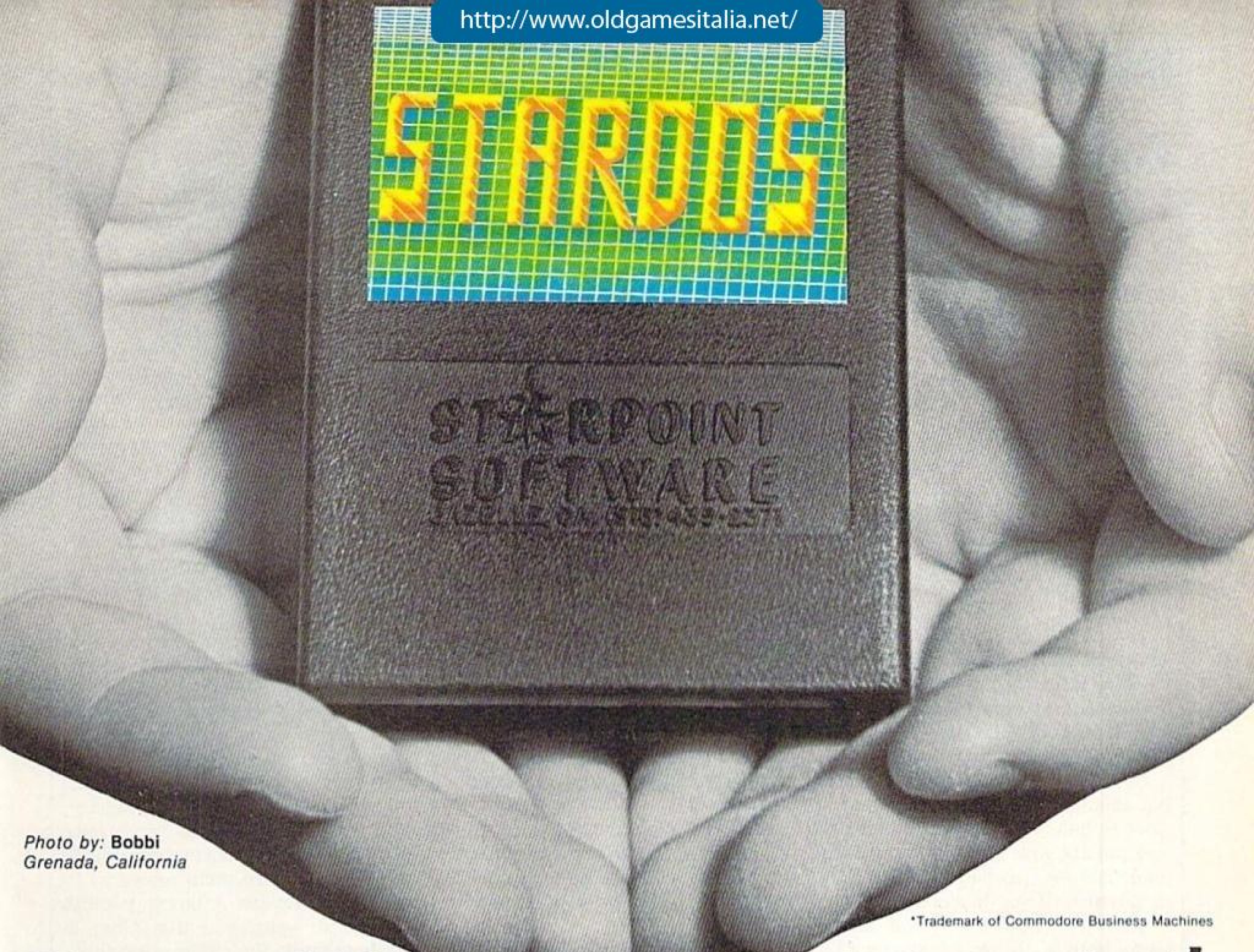
Each unit depletes their supplies when they move as well as when they attack, defend and fortify positions. A good commander will get his troops into position with enough supplies in reserve to both mount a powerful attack, and at the same time withstand an enemy counterattack. There is nothing worse than getting into position for a knock-out punch and finding your tanks out of fuel.

Terrain is important. Coastal plains are ideal for travel, but poor for defense. Mountains, while costly to travel through, are good to launch attacks from or just plain defend.

The game includes options for one or two players. Solo players are always assigned the Afrika Korps while the computer commands the British forces. Beware—the computer is an excellent general.

Knights of the Desert offers several options to keep the game from becoming repetitious. Options include a choice of five battle scenarios: The shortest battle is one turn, while the longest is 12 turns and spans the campaign for North Africa beginning in March of 1941 and ending in January of 1943. Playing time can vary from an hour for a single turn, or all day for the longest campaign. Strategic Simulations has also included a "save and replay" option, so a game can be saved after each turn to be

Continued on page 118



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REVIEWED BY JOHN JERMAINE

B.C. II: Grog's Revenge

Computer: Commodore 64
Publisher: Sierra
P.O. Box 485
Coarsegold, CA 93614
Medium: Disk
Price: $24.95

Players of *B.C.'s Quest for Tires* have already explored some of the mysterious regions of B.C., but there are more areas just waiting to be discovered in *B.C. II: Grog's Revenge*. So grab your joystick and enter this wacky world of cliff clams, cavemen, and tire-eating dinosaurs.

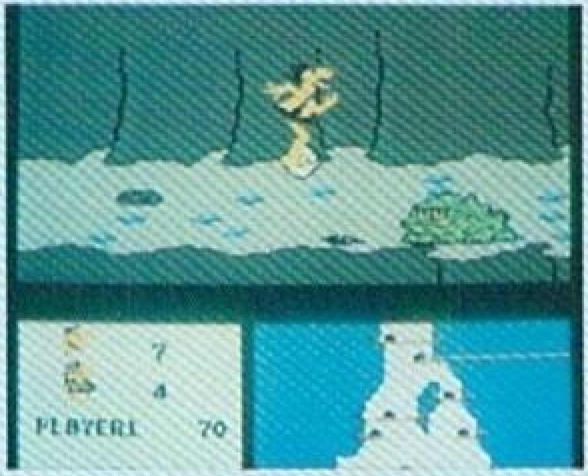
The object of *B.C. II: Grog's Revenge* is quite simple. Thor is harvesting clams along the mountain pathways and cave floors. This may sound easy, but there are two slight problems: Grog and tiredactyls.

Grog is also busy gathering clams, but should he see you or you get too close to him, Grog will forget his task and pursue you. The first rule of the game is to keep as far away from Grog as possible. If you make the mistake of getting too close, he will yell out his name with such force that you'll be blasted off the side of the mountain. This also terminates the game. A wise player will collect most of his claims in dead ends and from the floors of caves, because Grog is afraid of these areas. You might also leave a few clams along the paths to slow Grog's advance.

Tiredactyls are a special breed of dinosaur who love to munch on stone tires. They live along mountain paths and never venture into the caves. Moments after a tiredactyl has spotted you, it will move in your direction or maneuver in front of you with amazing speed. The best strategy to deal with one of these creatures is to back away from it and try to slip by on the opposite side of the cliff. If this plan seems doomed, use a cave as an escape route or retreat in the opposite direction.

Joystick controls in *Grog's Revenge* are simple to operate, but extremely sensitive. During the course of the game, Thor rides atop a stone tire in much the same manner that a circus performer rides a unicycle. You have complete control over which direction Thor travels, with the option to change direction, make a quick turn, or perform a zig-zag maneuver. Clams are automatically deposited into your account as soon as you drive over them.

Enter a wacky world of cliff clams, cavemen, and tire-eating dinosaurs in this sequel to B.C.'s Quest for Tires.



The graphics of the game are very well done, and give the player a keen sense of participating in a cartoon. Thor appears in the program dressed in typical caveman attire. As he rides atop a tire, his hair blows in the breeze, the tire bounces a bit on the ground, and his arms change position to help him keep his balance.

Grog is a short smiling hairball with spindly legs. Tiredactyls are green blob-shaped creatures with red eyes. Even Fat Broad makes an appearance in the program as a lazy toll collector. I was very pleased with the fact that each character in *Grog's Revenge* is accurately depicted, with many additional details to enhance each image.

There were also many interesting special effects incorporated into the game to add a touch of humor. If you accidentally steer Thor into a cliff wall, he flattens out against the wall and his tire slowly bounces away. Driving off a cliff is equally traumatic. The tire drops like a rock (no pun intended) while Thor hesitates for a moment and follows suit with a grim look on his face. Hitting a rock or a hole on a ledge stops the motion of your wheel, but Thor continues traveling with a look that says, "Why me?"

The cave scene in *Grog's Revenge* is also very interesting because you travel through pitch darkness, with your headlight providing the only light on the screen. As you explore these caverns, you'll discover both stationary and moving clams. They will add points to your score, while increasing your clam account. Avoid the stalagmites on the cave floor. If you should hit one of them, the picture goes black, and the word "crash" appears on the screen in large red letters.

Sound in *Grog's Revenge* is very good and works well with the graphics. The most impressive sounds in the program include the hum produced as you ride your tire and the single tone generated as you pick up each clam. There are also several different types of alarms in the program. Whenever Grog is close by, a loud alarm is sounded. This is a final warning that you have mere moments to make your escape. A buzzing sound is used to warn you that Grog is climbing down the cliff in your direction. Still another alarm is a single soft tone. This warning device lets you know that Grog is on your level of the mountain, and he'll appear on your pathway in just a moment.

Many players will argue that you don't need so many warning systems, but I don't agree. You can't spend all of your time watching the map at the bottom of the screen. It's also very difficult to constantly remember where Grog should be in relation to your present position on the map. Besides that, he's usually moving. Alarms give the player a moment to react if Grog appears unexpectedly.

Other unusual sounds were developed to support the special graphic sequences in the game. If Thor drives over a cliff, you can hear his tire fall, as well as the distant impact sound when he hits the bottom. Crashing into a wall generates a loud thud, as well as the bouncing noise of your tire heading for the cliff. Again you hear the final impact of the tire hitting the

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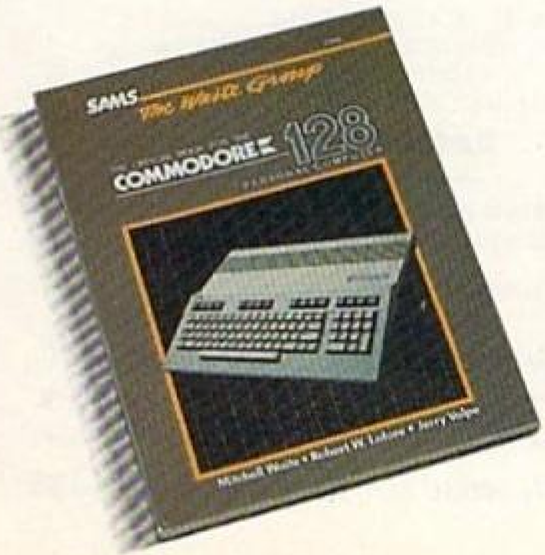
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bottom of the cliff, but the sound is a little different. Hitting a hole or rock creates an airborne noise.

Noises in the caves are also very unique. Again a single tone is generated as each clam is gathered, but you also hear things crawling around in the dark.

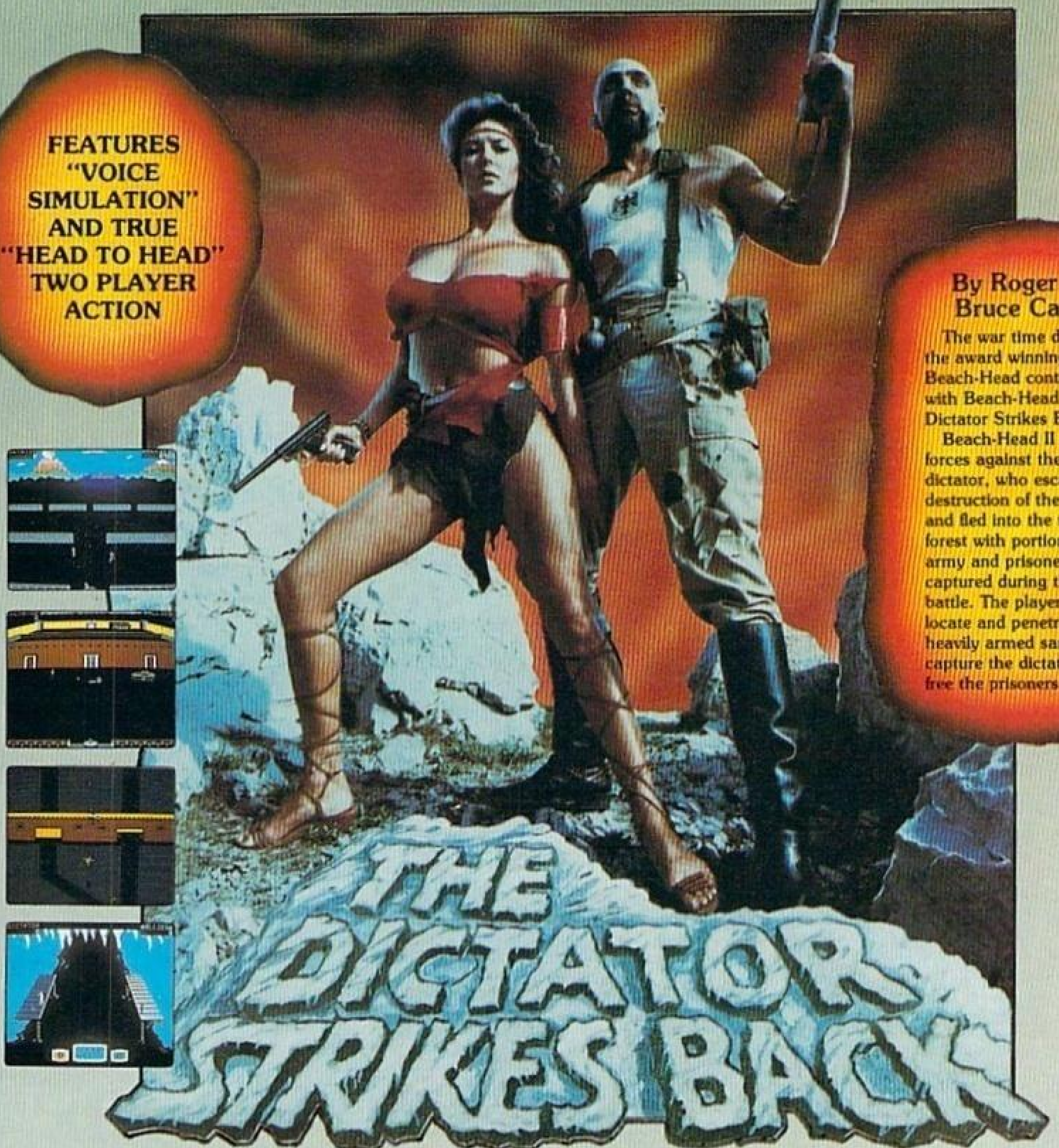
The game has several other very interesting features. The graphic map, which occupies the lower right hand corner of the screen, shows you the complete side of the mountain that you're on. Thor is represented by a yellow square on the map, while Grog is displayed as a white diamond. If Grog is on the opposite side of the mountain, you won't see him on the map. Whenever Grog is on your side of the mountain, you can easily keep track of his movements.

The unusual scoreboard, also located on the bottom of the screen, is equally easy to understand. Beside each picture of Thor and Grog is an account of how many clams each has harvested. Actual player scores are recorded beneath the clam accounts. It pays to keep a close eye on your clam account, because a toll of 100 clams will allow you to cross the bridge and advance to the next mountain.

Once you pick up as many clams as you want, it's time to find the toll bridge. Every toll bridge is located on the opposite end of a tunnel, so explore the tunnels in your area and remember where each tunnel exists. The toll bridge is merely the character Fat Broad, reclining upon a stone sign, demanding a toll in exchange for letting you advance to the next level of play. Driving to the booth when you don't have the proper toll in your account will cost you a wheel. You can then exit the cavern, but don't get too close to the toll booth. If you carry the toll when you find the bridge, you're automatically drawn to the booth, pay the toll, and advance.

Younger players will appreciate the simple scoreboard and easy-to-understand rules. Older, more experienced gamers will eagerly accept the program's challenges. Everyone will enjoy the many humorous ways to lose tires in the game. *Grog's Revenge* may be different things to different people, but everyone will agree on one thing: It's a lot of fun. ■

BEACH-HEAD II



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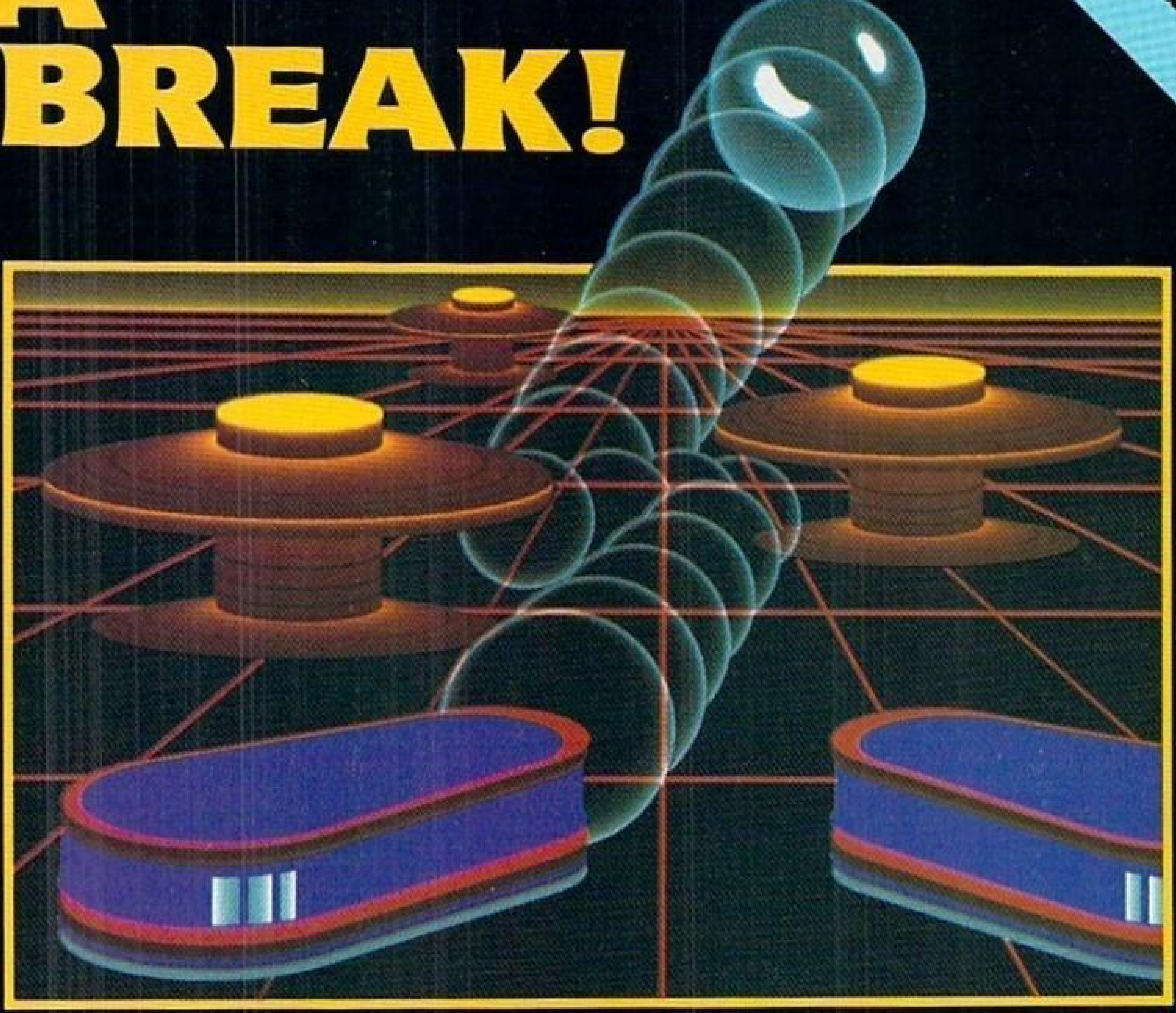

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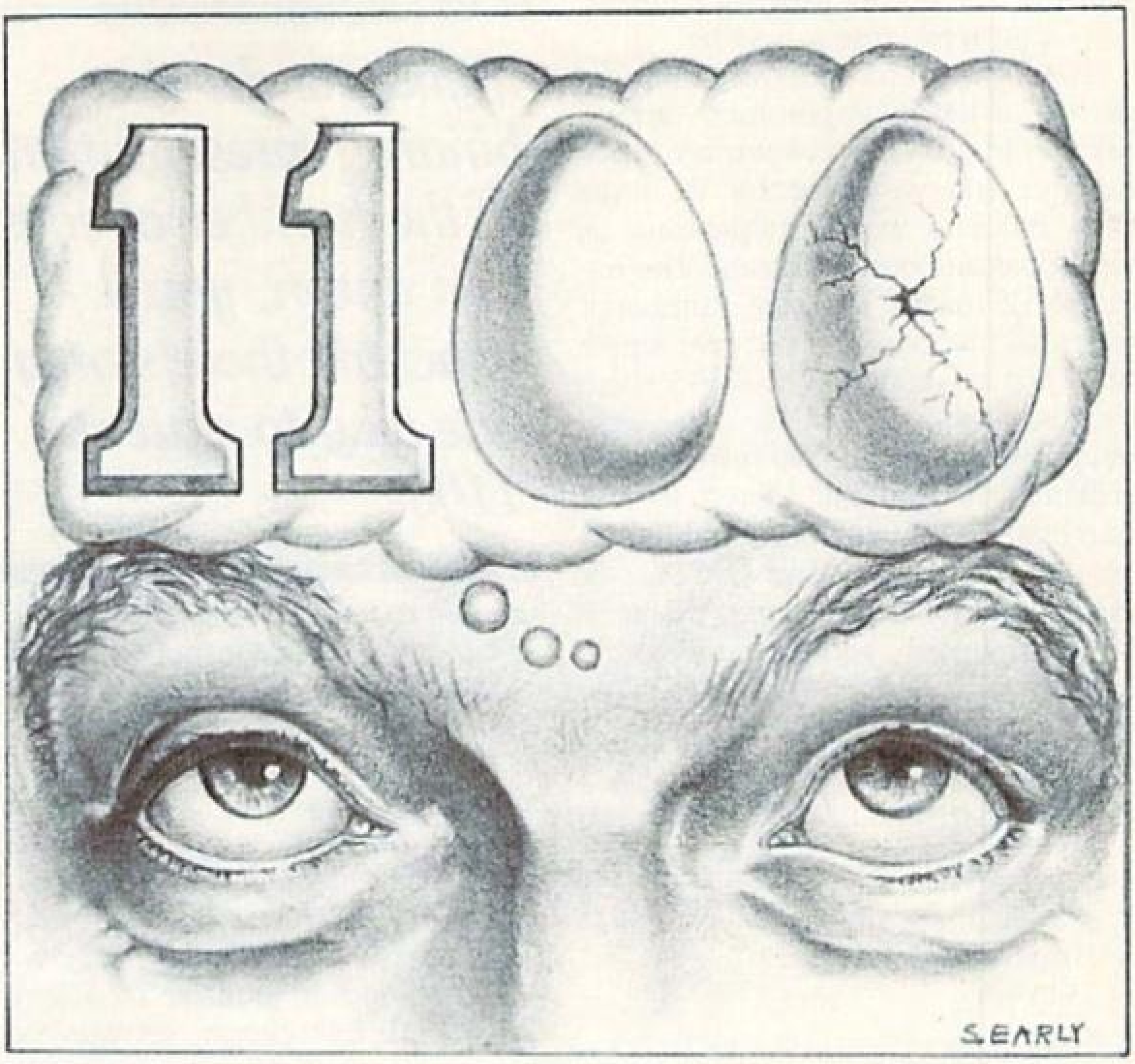
BY LOUIS F. SANDER

Computer Counting I

Binary Demystified



Since the earliest days of man, numbers and counting have intrigued humanity, from commoners to kings. For most of human history, knowledge of numbers was restricted to mystics and philosophers, who used that knowledge to maintain their positions of power. Today, since number knowledge is taught to every schoolchild, it has lost its mystic significance, and every educated person has some degree of numerical skill.

So common is number knowledge, in fact, that most of us have forgotten its basic foundations. But knowledge of those foundations is important in computer work, and if we've forgotten it, we'll be hard pressed to advance beyond the beginner stage. If we don't know binary, for example, we'll never know hexadecimal. And if we don't know hexadecimal, some fascinating parts of computerdom will be forever beyond our ken. But binary and hex are easy, provided we graduated from grade school, and provided we're willing to do some review.

This month's column is devoted to that review, as it applies to binary numbers. If you follow it step-by-step, you'll gain (or regain) some vital knowledge, which in another time could have made you a philosopher. It won't be quite so powerful in 1985, but it *will* open the door to lots of computing enjoyment. In *Commodore Power/Play*'s next issue, we'll use our knowledge of binary to master hexadecimal.

First, let's talk about *number*. What is there in common among a dozen eggs, the members of a jury, the months in a year, and this group of X's: XXXXXXXXXXXX? Of course the answer is their number. Each of the groups in question has 12 members, as we can easily see if we count them. If you think about it a bit, you'll conclude that number is a very abstract idea, even though we think about it with ease. We can't see number. We can't feel number. In fact, the only way to speak about it is when it's associated with some tangible thing like eggs.

Even though number is highly intangible, man has developed many ways of dealing with it. First, of course, we can speak of it. If you speak English, you say there are "twelve" eggs in a dozen. If you speak French, you say "douze." If you're Spanish, you say "doce." Those things, of course, are *words*, not numbers. The *number* is the intangible property to which they refer.

If we wanted to write a number on paper, we could just write down the spoken word we use to represent it. In fact, that's what I did in the previous paragraph. But there are better ways to write down numbers, using symbols that have been developed expressly for that purpose. If you were an ancient Roman referring to a dozen eggs, you would write XII. In fact, if you lived in Europe before the sixteenth century, that is exactly how you would have written the number 12. Other people in other places might have written something like this: *𝍸 𝍸 //*.

Those symbols, of course, are not numbers at all. They merely refer to the number associated with a basket of eggs. Symbols which stand for numbers are called *numerals*. And while there are many systems of numerals, only one of them is in general use in the non-computer world today—the decimal system. In the decimal system, 12 eggs make a dozen. Is "12" a number? Is "XII" a number? By now you should know that the answer is NO. Those three things are merely *symbols* for numbers, which are abstract qualities of countable things. "Twelve" is the written form of a spoken word, while "12" and "XII" are numerals.

As many of you know, the system of Roman numerals used seven basic symbols: I, V, X, L, C, D, and M. By following certain rules for stringing them together, these symbols could be used to represent any number from one to many thousand. The system isn't very useful in today's world, where we often need to count into the millions and beyond.

The decimal system of numerals uses ten basic symbols, or *digits*: 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. By following certain rules for stringing them together, we can use these ten digits to make up the numeral for any number, no matter how large it may be.

The "system for stringing them together" is keenly important to our understanding. When we write a decimal numeral, we know that its digits have different values, depending on their position in the numeral. The numeral 12 means that the number it refers to has one ten and two single units, or ones; when we add them together, we get 12, the number of members in a jury. If we reversed the orders of the digits and wrote 21, our numeral would have quite a different meaning—two tens and one one, or the number of days in three weeks. If you remember your second-grade math, you remember the names of the columns from right to left. They are:

Ones
Tens
Hundreds
Thousands
Tens of thousands
Hundreds of thousands
Millions
etc.

There are names for as many columns as you care to define, and one of the favorite pastimes of some schoolchildren is to figure them out and learn them.

The idea that the numerical value of a digit depends on the column it is in is called *place value*, and it applies not only to decimal numerals, but also to others such as binary and hexadecimal numerals. The rightmost position is always the units position, and it is used in counting from one up to the value of the highest digit in the numbering system. The value of the second position depends on the so-called base of the numbering system, which can be determined by counting the number of symbols, or digits, that the system uses. In the binary numbering system, there are two symbols, 1 and 0, so the second column is the "twos" column.

In numeral systems using place value, the third column has the value of the square of the number of symbols in the system. In the decimal system, it is the hundreds column, while in the binary system, it's the fours column.

The values of the columns keep increasing in the same way as we move leftward. Each one has the value of the one to its right, times the number of digits used in counting.

If you ponder the binary representation of the number of eggs in a dozen, you'll conclude there's only one way to state it: 1100.

Now that we've reviewed the elementary principles, let's apply them to the binary numbering system. Binary is important in computers because computers rely on digital circuits, each of which is either on or off. Hardware engineers have developed ways to count and do math with these on and off signals. To describe the counting processes, software people use the binary numbering system. This system has only two digits—0 and 1—and its columns from right to left are as follows:

Ones
Twos
Fours
Eights
Sixteens
Thirty-twos
Sixty-fours
One hundred twenty-eights
etc.

Notice how we've named the columns with words, not numerals. That's to emphasize the differences between three distinctly different concepts: number, the words used to refer to number, and the numerals or special symbols used to represent numbers on paper. Common speech and writing generally disregard these differences, but since we're trying here to understand them, we're carefully watching our words.

As in the decimal system, we can continue naming columns for as long as we'd like. The next one would be "two hundred fifty-sixes," and so forth. But as a practical matter, we hardly ever deal with binary numbers of greater than eight columns. Such numbers would be uncomfortably long, and the ones and zeros would be disconcertingly confusing. The hexadecimal numbering system, to be discussed in the next issue, is used to reduce the confusion.

You've probably already learned that a single binary digit is called a *bit*, and that an eight-bit binary numeral is called a *byte*. Since in the minds of the uninitiated, knowing those two words makes you an absolute computer guru, maybe numeric knowledge *hasn't* lost its mysterious power!

If you ponder the binary representation of the number of eggs in a dozen, you'll conclude there is only one way to state it—one four and one eight. If you write it down, you'll write 1100.

Evaluating the columns from right to left, you see there are no ones, no twos, one four and one eight. Counting them upon your fingers and toes, you'll find that there really are 1100 eggs in a binary dozen.

Since the numeral 1100 stands for different numbers, depending on whether it's a binary or decimal numeral, we must take special pains to denote the system we are working in, unless the fact is obvious by context. A common practice is to precede binary numbers with a percent sign, or to follow them with the letter b or B. Sometimes they are followed by the subscript 2.

It's also common practice to write binary numerals in groups of four or eight bits, providing leading zeros where required. When the eight bit grouping is used, it's usually divided into two groups of four. So if we are using binary, the number of months in the year would be written 1100, or perhaps 0000 1100. Other ways would be %00001100 and 1100_2.

If you understand what's been said so far about binary, you can consider yourself initiated into its mysteries. Moving into the expert class takes very little practice, and we encourage you to make the move right now. All you must do is write down, in order, the binary numerals for all the numbers from zero to fifteen. If you do it %100 times or so, and do it 100% correctly, you'll be able to do it without thinking, and that skill will serve you greatly in your computer efforts. As you work your way up to 15, notice

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how the repeating patterns of the digits make it easier to tell what comes next. It's just like working in decimal, where everybody knows what comes after 99999, even though few of us have actually counted that high. This simple little table will help you in your work:

0000	zero
0001	one
0010	two
0011	three
0100	four
0101	five
0110	six
0111	seven
1000	eight
1001	nine
1010	ten
1011	eleven
1100	twelve
1101	thirteen
1110	fourteen
1111	fifteen

Now that you're an expert in counting, let's make you an expert in math. If you know how to add in decimal, you can easily add in binary, especially if you limit youself to taking the sum of two numbers. The difference is that the sums are easier to do, and carrying is a lot more frequent. Start by doing this sum:

```
  0001
+ 0100
------
  0101
```

Simple, isn't it? Now do this one:

```
  0001
+ 0101
------
  0110
```

The difference is the carry. When a column adds up to more than one, you put down a zero and carry the one. If you try it with a few examples of your own, you'll be an addition whiz in no time.

Subtraction is easy, too, but instead of carrying, you borrow. For an example without borrowing, try

```
  0101
- 0100
------
  0001
```

For borrowing practice, do this one:

```
  0110
- 0001
------
  0101
```

Binary multiplication and division are hopelessly complicated, except for two special cases. If you want to double a binary number, just add a zero to the right. And if you want to halve one, drop the rightmost zero. The principles are analogous to those in decimal arithmetic, where adding a zero multiplies by ten and dropping a zero divides by ten.

Binary numerals lend themselves to four other operations not usually found in the decimal world. These are called *logical operations* or Boolean operations, and they are very simple to do. The four operations are AND, OR, XOR (exclusive or) and NOT.

AND is done on two binary numerals, and is done on a bit-by-bit basis, with nothing like carrying or borrowing involved. ANDing two numerals results in a third, which is derived in a very simple way. Starting at one end of the numerals to be operated on, compare their two corresponding bits (the bits in the same columns of both numerals). If both bits are ones, the corresponding bit in the result is also a one. For any other situation, the resultant bit is a zero. For example:

```
     0011  0101
AND  1111  0000
     ----------
     0011  0000
```

The OR operation is done similarly, but with a different rule for determining the result. In ORing, if either or both of the two compared bits are ones, the resultant bit is also a one. Using the same numerals as before,

```
    0011  0101
OR  1111  0000
    ----------
    1111  0101
```

XOR is much like OR, except that if both bits are ones, the result is zero. The result bit will be one if one and only one of the original bits are ones. Here's an exclusive OR

```
     0011  0101
XOR  1111  0000
     ----------
     1100  0101
```

XOR has a little-discussed but very interesting property, which you can see from this example: XOR two binary numerals to get a third. Then XOR any two of the three, and the result will always be the other one! It's like something from the twilight zone, and it's part of the mystique of numbers.

NOT, the last of the Boolean operations, works on a single binary numeral. To NOT a numeral, change all its ones to zeros, and change all its zeros to ones. For one of our familiar examples,

NOT 0011 0101 = 1100 1010

You can NOT the other on your own.

You may be aware that Commodore BASIC includes AND, OR and NOT functions, and that BASIC 7.0 also includes XOR. Although these functions behave just as we have described them, they operate on 16-bit numerals, the leftmost bit of which is considered to be a sign bit, for indicating negative numbers. Also, they use decimal numerals for input and output, making the binary conversions internally. That extra complexity makes them seem to behave irrationally, but you can be sure they are perfectly logical. It's just hard for normal people to follow the logic, and to my knowledge it's never been fully explained from a beginner's point of view. Maybe we'll try it next time, when we branch out into hex.

For now, we're finished with binary. If you've followed our discussions, you should no longer be in the dark on this elementary computer subject. For a little drill and practice, you can try the accompanying program, which works on all Commodore computers. It gives the eight-bit binary version of any number between 0 and 255 decimal (numbers outside that range cannot be expressed in eight bits). To exit the program at any time, press RETURN in response to the prompt.

Decimal to Binary Conversion

```
10 REM DECIMAL TO BINARY CONVERTER
20 A%=-1:INPUT "DEC";A%
30 IF A%<0 OR A%>255 THEN END
40 PRINT TAB(10);CHR$(145);"% ";
50 FOR J=7 TO 0 STEP-1
60 IF J=3 THENPRINT " ";
70 IF A%AND(2↑J) THEN PRINT"1";:GOTO90
80 PRINT "0";
90 NEXT : PRINT : GOTO20
```

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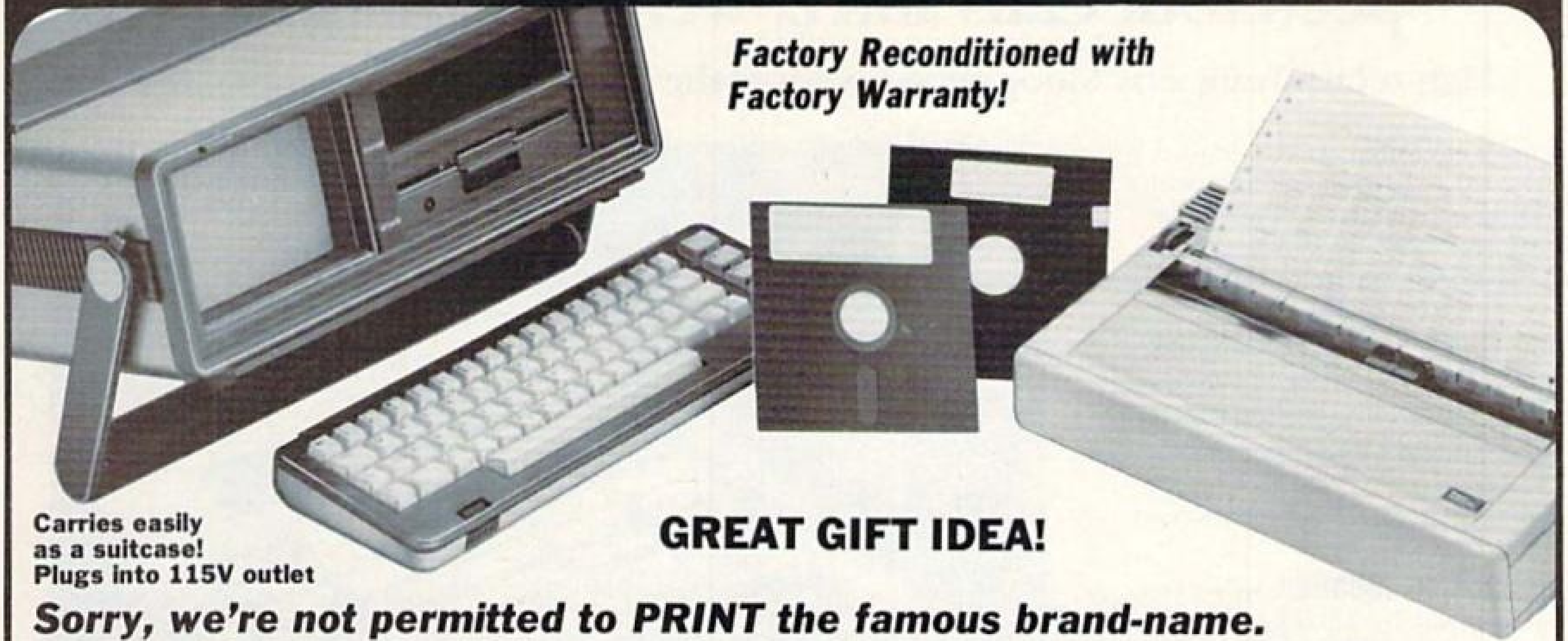

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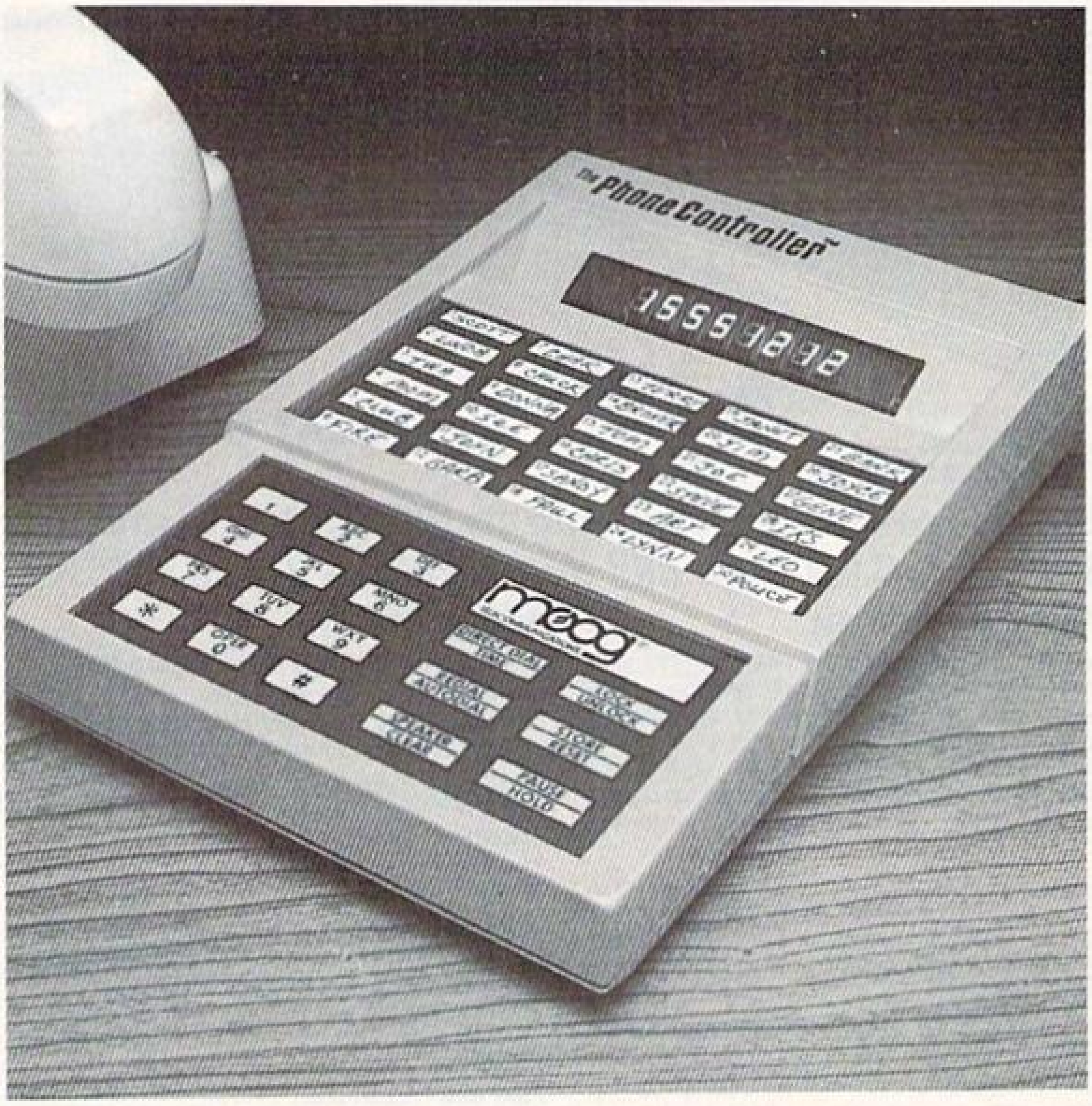

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BY BRUCE JAEGER

Christmas Card

A "Snow Scene" for the Commodore 128

Remember those little dime-store Christmas dioramas that were filled with water and little "snow" chips? When you shook them up, the snow would fall and swirl quite realistically around the manger scene or Christmas tree inside the container. This short little Christmas Card program for the Commodore 128 was constructed along those lines—only you don't have to shake the computer!

Because of magazine space limitations, my "diorama" consists only of a decorated Christmas tree, a snowbank, and a view of Santa and his sleigh flying by in the distance. Even if you're not yet familiar with the 128's graphics commands, by the time you finish entering the program into your computer you'll probably have a good idea of how the scene is drawn, and you'll be able to add your own touches; perhaps some background trees, houses, or country roads. ■

Before typing this program, read "How to Enter Programs."

Christmas Card

```
100 GRAPHIC 3,1 : GRAPHIC 0,1
110 COLOR 0,1 : REM BLACK BACKGROUND
120 COLOR 1,10: REM BROWN
130 COLOR 2,6 : REM GREEN
140 COLOR 3,2 : REM WHITE
150 COLOR 4,1 : REM BLACK BORDER
160 DEF FN R(X)=INT(RND(1)*X)+1
170 DIM S(20)
180 X=RND(-TI)
190 FOR X=1 TO 8 : SPRITE X,0 : NEXT
200 :
210 GRAPHIC 3,1
220 NF=20:DIM H(NF),V(NF),C(NF)
230 SCALE 1 : WIDTH 2
240 :
250 REM TREE
260 DRAW 1,480,800 TO 480,999
270 DRAW 1,480,999 TO 520,999
280 DRAW 1,520,999 TO 520,800
290 DRAW 1,520,800 TO 480,800
300 PAINT 1,500,890
310 DRAW 2,500,45 TO 300,800
320 DRAW 2,500,45 TO 700,800
330 CIRCLE 2,500,650,300,200,140,220
340 PAINT 2,500,100
350 :
360 REM SNOWBANK
370 YC=185 : SCALE 0
380 FOR X=0 TO 160
390 YC=YC+FN R(3)-2
400 IF YC<180 THEN YC=180
410 IF YC>195 THEN YC=195
420 DRAW 3,X,YC
430 NEXT
440 DRAW 3,0,199 TO 160,199
450 PAINT 3,0,190
460 :
470 REM GARLANDS
480 SCALE 1 : WIDTH 2
490 CIRCLE 3,500,100,50,100,145,215
500 CIRCLE 3,500,100,100,200,145,215
510 CIRCLE 3,500,100,200,350,153,207
```

Continued on pg. 57

Remember those dime-store Christmas dioramas filled with water and little "snow" chips? This program is constructed along those lines —only you don't have to shake the computer.

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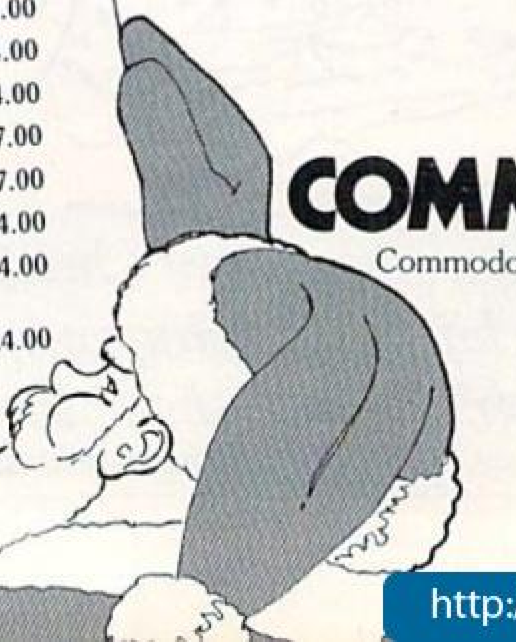

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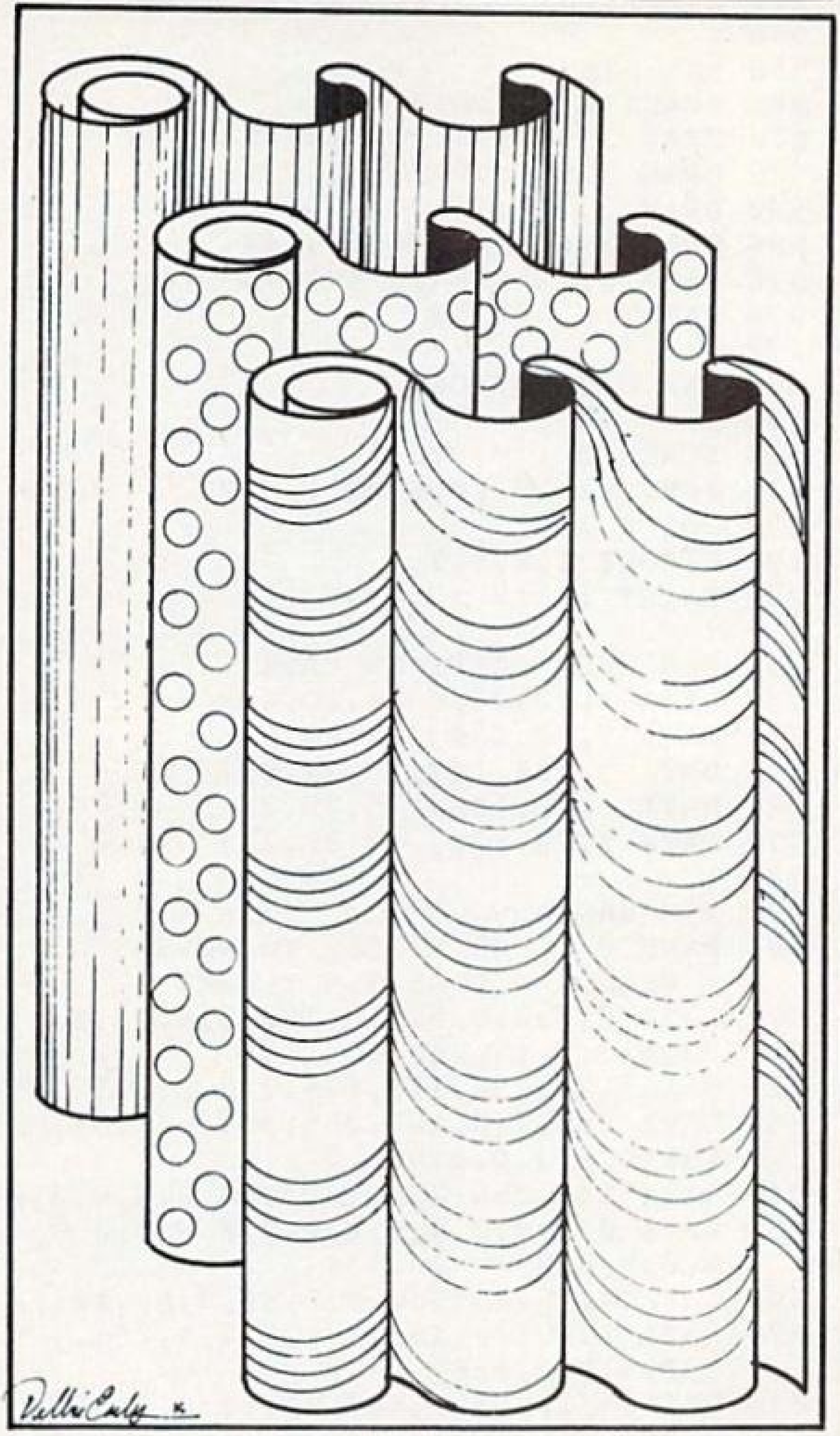
```
520 CIRCLE 3,500,100,300,500,155,205
530 CIRCLE 3,500,100,400,650,156,204
540 :
550 REM STAR
560 SCALE 1 : WIDTH 2
570 DRAW 3,480,75 TO 500,20
580 DRAW 3,500,20 TO 520,75
590 DRAW 3,520,75 TO 475,40
600 DRAW 3,475,40 TO 525,40
610 DRAW 3,525,40 TO 480,75
620 PAINT 3,500,50
630 :
640 REM DECORATIONS
650 :
660 SCALE 0 : WIDTH 1
670 FOR J=1 TO 10:READ C,X,Y
680 COLOR 1,C
690 CIRCLE 1,X,Y,2,3
700 PAINT 1,X,Y : NEXT
710 :
720 REM BULB POSITION DATA
730 DATA 3,70,75,   8,80,45
740 DATA 7,83,130,  7,85,64
750 DATA 3,100,147, 5,72,93
760 DATA 8,55,156,  5,78,26
770 DATA 3,70,120,  9,92,103
780 :
790 REM SANTA
800 BANK 0 : FOR X=3968 TO 4095
    : READ Z : POKE X,Z : NEXT
810 DATA 0,0,0,0,0,0,0,192,0,0,96,0,
    32,112,0,48,240,0
820 DATA 120,254,170,124,248,0,127
830 DATA 255,240,127,255,224,63,255,
    192,2,2,3,4,1,6,8,0
840 DATA 140,255,255,248,0,0,0,0,0,0,0
850 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0
860 DATA 4,16,0,2,32,0,1,64,0,0,240
870 DATA 170,170,252,7,1,192,3,255,
    192,3,255,128
880 DATA 3,129,192,6,0,96,12,0,24,56,
    0,12
890 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0,0
900 :
910 MOVSPR 7,00,100
920 MOVSPR 8,24,100
930 SPRITE 7,1,3,1,0,0,0
940 SPRITE 8,1,3,1,0,0,0
950 MOVSPR 7,90#2 : MOVSPR 8,90#2
960 :
970 REM SNOWSPRITES
980 FOR J=1 TO 15:READ S(J):NEXT
990 DATA 8,64,4,0,0,0,0,0,0,0,0,0,0,0,
    0
1000 FOR J=3584 TO 3967
1010 POKE J,S(FN R(15))
1020 NEXT J
1030 FOR J=1 TO 6:MOVSPR J,J*52-25,
     FN R(180):NEXT
1040 FOR J=1 TO 6:SPRITE J,1,2,0,1,1,0
     :NEXT
1050 FOR J=1 TO 6:MOVSPR J,180#1:NEXT
1060 :
1070 :
1080 REM MUSIC (ADD AS MUCH AS YOU
     WANT!)
1090 REM OH TANNENBAUM
1100 TEMPO 10 : PLAY "V1T5 U5X0 V2T5
     U5X0"
1110 RESTORE 1210 : GOSUB 1170
1120 RESTORE 1210 : GOSUB 1170
1130 RESTORE 1410 : GOSUB 1170
1140 RESTORE 1210 : GOSUB 1170
1150 SLEEP 10 : GOTO 1080
1160 :
1170 REM PLAYING MECHANISM
1180 READ P$ : IF P$="0" THEN RETURN
1190 PLAY P$ : GOTO 1180
1200 :
1210 REM FIRST PART
1220 DATA "V1T5 V2T5 U5X0"
1230 DATA "V1 O2 Q. G"
1240 DATA "V1 O2 Q E V2 Q O3 C "
1250 DATA "V1 O2 I R V2 I O3 C "
1260 DATA "V1 O2 Q. E V2 Q. O3 C "
1270 DATA "V1 O2 Q. F V2 Q. O3 D "
1280 DATA "V1 O2 Q G V2 Q O3 E "
1290 DATA "V1 O2 I R V2 I O3 E "
1300 DATA "V1 O2 Q. G V2 Q. O3 E "
1310 DATA "V1 O2 Q G"
1320 DATA "V1 O3 I E"
1330 DATA "V1 O2 Q[SPACE2]F V2 Q
     [SPACE2]O3 D "
1340 DATA "V1 O2 I[SPACE2]G V2 I
     [SPACE2]O3 E "
1350 DATA "V1 O2 Q. A V2 Q. O3 F "
1360 DATA "V1 O2 Q. G V2 Q. O2 B "
1370 DATA "V1 O2 Q[SPACE2]F V2 Q
     [SPACE2]O3 D "
1380 DATA "V1 O3 I C"
1390 DATA "V1 O2 Q. E V2 Q. O3 C "
1400 DATA "0"
1410 REM SECOND PART
1420 DATA "V1T5 V2T5 U5X0"
1430 DATA "V1 O3 Q. G "
1440 DATA "V1 O2 Q E V2 O3 Q G"
1450 DATA "V1 O2 I R V2 O3 I E "
1460 DATA "V1 O2 Q. F V2 O3. Q A"
1470 DATA "V1 O1 Q A "
1480 DATA "V1 O2 I E V2 O3 I G"
1490 DATA "V1 O2 Q E V2 O3 Q G"
1500 DATA "V1 O2 I D V2 O3 I F"
1510 DATA "V1 O2 Q. D V2 O3 Q. F"
1520 DATA "V1 O1 Q G "
1530 DATA "V1 O1 I R V2 O3 I F"
1540 DATA "V1 O2 Q D V2 O3 Q F"
1550 DATA "V1 O3 I D "
1560 DATA "V1 O2 Q. D V2 O3 Q. G"
1570 DATA "V1 O1 Q G "
1580 DATA "V1 O1 I R V2 O3 I F"
1590 DATA "V1 O2 Q D V2 O3 Q F"
1600 DATA "V1 O1 I R V2 O3 I E"
1610 DATA "V1 O2 Q. C V2 O3 Q. E"
1620 DATA 0
```

END

BY BENNETT COOKSON, JR.

Headliner

for the Commodore 64



Print posters, signs, greeting cards, even wrapping paper, using this program.

This is the program that makes headlines. With the Commodore 64, a VIC-1525 or an MPS-801 printer, and Headliner, you can make posters, signs, greeting cards, or even wrapping paper.

Headliner is powerful and short. Instead of having to define each character, Headliner peeks into ROM and copies the complete character set, including graphics and reverse characters.

Headliner is menu-driven and easy to use. First, you will be asked to decide from among three modes. Mode one is regular upper case letters and graphics. Mode two is upper and lower case letters. Mode three is reverse characters. When you use reverse mode, capital letters will look regular on the screen but will be printed out in reverse. Only the capital letters will be in reverse; lower case letters will be printed normally. Once you choose one of these modes, the program will stay in that mode until you run the program again.

The next menu offers four sizes of letters. Size one is the biggest—a little over an inch high, with ten letters per line. They are made by printing little letters in the shape of big letters. Size two is about 3/4 of an inch high, with 20 letters per line. These letters are made up of little squares. Sizes three and four are the regular size type and double-width, respectively. You can mix large and small letters on the same page.

The printing is done in groups of lines. After choosing the size, you will be asked for the number of lines and prompted to enter each line. When the computer is finished printing, the menu will return to the screen.

Using Headliner in Other Programs

The part of this program that does all the work is in the subroutines starting at line 6000 and 6200. You could easily use these subroutines in your own programs by just setting the proper variables. To do so, use the following lines, which will set the needed variables to run the Headliner subroutines. In fact, you could use the following lines in place of all the lines before 6000, except that the program then won't be as easy to work with.

```
500 OPEN 4,4:SA=53248:GOSUB 6000
510 INPUT"1(biggest) or 0";D
512 IF D=1 THEN PRINT#4,CHR$(15);
514 IF D=0 THEN PRINT#4,CHR$(8);
520 INPUT"center (Y/N)";C$
530 INPUT"number of lines";NL
540 FOR L=1 TO NL:INPUT W$(L):NEXT
550 GOSUB 6200:GOTO 510
```

The initializing subroutine 6000: SA is the start address of the character set in ROM (taken from the *Commodore 64 Programmer's Reference Guide*, page 105) and is set depending upon the type of characters you want. See lines 10-23.

The printing subroutine 6200: D is the size, either one or zero. The number one sets the ten letters-per-line size, zero sets the 20 letters-per-line size. (See lines 50-95, 251-252.) Lines 512-514 set the proper printer mode. Size one is printed in standard character mode, size zero is printed in graphics mode. Line 520: if C$ is set to "Y" then the program will center each line (Lines 100-105.) Lines 530-550 set NL to the number of lines and fill the array W$(L) with each line. (See lines 200-240.)

That is really all you need to do to use Headliner in another program. Lines 10-350 in the program do the same thing as lines 500-540 would do except that the main program is much nicer and it allows you to more easily use Headliner.

How it Works

Lines 6050-6100 transfer the character set from ROM to the array B%(X,C). The array is used for easy access to the character data. The program could be changed to peek directly into ROM each time a character is needed. This way the array B%(X,C) would no longer be needed, which would save about 2K of memory, and there would be no waiting time at the beginning of the program. The only disadvantage is that the I/O would be switched off and on many times. So you would have to be more careful, as explained below.

Before a program can peek into this part of memory it must first turn the keyboard and other interrupts off, switch I/O (Input/Output) out and character ROM in. (See page 106 in the *Commodore 64 Programmer's Reference Guide*.) This will all be taken care of in the program, but you must be careful that there are no errors or output (like PRINT) during this part of the program. If there is an error while the I/O is switched out . . . Crash! it's all over. Save your program before you run it to be sure.

Make the following changes to remove the array B%(X,C):

Move line 6050 to 6215
Move line 6100 to 6265
Change line 6260 to:

```
6260 FOR X=0 TO 7:P(X,Y)=PEEK(SA+X+C
     *8):NEXT:NEXT
```

Delete lines 6049-6100 and take B%(7,128) out of line 6010

Line 6130 alters the character data for a "1" to make it look better. (Notice that 49 is the POKE value of a "1".) You can change the shape of any character in this way, or even design custom characters just like you would for the screen.

Lines 6230-6260 loop for each character in W$ and fill the array P(X,Y) from the character definitions in B%(X,C). Line 6250 converts C from ASCII to its POKE value.

Lines 6270 and 6300 center the line if C$="Y".

Lines 6290-6350 do the printing. Line 6290 loops X for each of the eight rows of small letters or squares that make up a line of big letters. Line 6310 loops Y for each part of a character in the X row. Thus P(X,Y) is equal to one of the character definition numbers. Line 6320 loops PW eight times for each number, so that line 6330 can look at each bit of the number in P(X,Y). If the bit is on, a square is printed. If the bit is off, a space is printed.

Headliner can print big letters in two different sizes. The variable D controls which size to print. (The D=1 size is made up of small letters, the D=0 size is made up of little squares.) Line 6340 prints either a small letter or a square. If D=0 then L$(Y*D) is equal to L$(0), which is a square (set in line 6030). If D=1 then L$(Y*D) is equal to L$(Y), which is the letter being made (set in line 6240). Also in line 6330, S$(1) is a regular space, while S$(0) is a smaller space. ■

Before typing this program, read "How to Enter Programs."

Headliner

```
10 PRINT CHR$(147):PRINT
   :PRINT"CHOOSE PRINTING MODE"'EHYG
11 PRINT" 1: REGULAR UPPER CASE"'BAEE
12 PRINT" 2: UPPER & LOWER CASE"'BANF
13 PRINT" 3: REVERSED CHARACTERS"'BAKG
20 GET K$:IF K$<>"1"AND K$<>"2"AND
   K$<>"3"THEN 20'LLCI
21 IF K$="1"THEN SA=53248:OPEN 4,4
   :TP=15:PRINT CHR$(142):GOTO 30'JCTK
22 IF K$="2"THEN SA=55296'EJOE
23 IF K$="3"THEN SA=56320'EJEF
25 PRINT CHR$(14):OPEN 4,4,7
   :TP=17'EPVI
30 PRINT CHR$(147):PRINT" ONE MOMENT
   PLEASE....":GOSUB 6000'ELRJ
40 FOR X=1 TO 4:READ MX(X):NEXT'FKTF
42 DATA 10,20,80,40'BLYE
50 PRINT CHR$(8);CHR$(147)
   :PRINT TAB(15)"HEADLINER"'FNNJ
55 IF SA=56320 THEN PRINT"REVERSE
   MODE"'EHYN
60 PRINT:PRINT:PRINT" CHOOSE A SIZE"
   :PRINT'EDKI
71 PRINT" 1: 10 CHARACTERS PER
   LINE"'BAJL
72 PRINT" 2: 20 CHARACTERS PER
   LINE"'BALM
73 PRINT" 3: STANDARD SIZE"'BAAL
74 PRINT" 4: STANDARD DOUBLE
   WIDTH"'BAOO
75 PRINT" 5: QUIT PROGRAM"'BAHM
80 GET K$:IF K$=""THEN 80'EHFI
85 IF ASC(K$)<49 OR ASC(K$)>53 THEN
   80'HORQ
90 K=VAL(K$)'CFEH
95 IF K=5 THEN CLOSE 4:PRINT CHR$(9)
   :END'HIWQ
100 PRINT:PRINT:PRINT" DO YOU WANT IT
    CENTERED?[SPACE2](Y/N)"'DCDF
105 GET C$:IF C$<>"Y"AND C$<>"N"THEN
    105'IKWH
110 PRINT#4,CHR$(15);CHR$(TP);'DMRA
115 IF K=2 THEN PRINT#4,CHR$(8);'FICF
120 IF K=4 THEN PRINT#4,CHR$(14);'FJTC
200 PRINT CHR$(147):PRINT" SIZE";K
    :NL=1'EMMC
205 PRINT" A MAXIUMN OF";MX(K);
    "LETTERS PER LINE"'BHVL
210 INPUT" HOW MANY LINES OF THIS
    SIZE";NL:IF NL=0 THEN 50'EJJJ
220 PRINT"TYPE A [POUND] FOR MENU"
    :PRINT:PRINT'DCXE
225 FOR L=1 TO NL'DEMF
230 PRINT"LINE";L;:w$(L)=""
    :INPUT W$(L)'DPWF
232 IF W$(L)="[POUND]"THEN 50'DHOE
235 IF LEN(W$(L))>MX(K) THEN PRINT
    "LAST LINE TOO LONG[DOWN]"
    :GOTO 230'GQMQ
240 NEXT'BAEA
251 IF K=1 THEN D=1:GOSUB 6200'FJWH
252 IF K=2 THEN D=0:GOSUB 6200'FJWI
```

```
253 IF K=3 OR K=4 THEN GOSUB 300'GHXJ
260 GOTO 50'BCMC
300 FOR L=1 TO NL:PRINT#4,'EHGB
310 T=40-LEN(W$(L))/((K=3)*-1+1)'ISJH
320 A%=T/10+48:B%=T-(A%-48)*10+48'IVKI
330 IF C$="Y"THEN PRINT#4,
    CHR$(16)CHR$(A%)CHR$(B%);'HRII
340 PRINT#4,W$(L):NEXT'CIDD
350 RETURN'BAQC
5995 END'BACU
5999 REM*** THE HEADLINER
     SUBROUTINES'BBUG
6000 REM PEEK INTO ROM CHARACTER
     SET'BXJF
6010 DIM P(7,21),B%(7,128),L$(21),
     S$(1),W$(30)'BMIG
6020 L$(0)="":S$(0)="":S$(1)=" "'DROF
6030 FOR X=1 TO 3:L$(0)=L$(0)+CHR$
     (255):NEXT'HUWJ
6040 FOR X=1 TO 3:S$(0)=S$(0)+CHR$
     (128):NEXT'HUKK
6049 REM TURN KEYBOARD OFF & SWITCH
     IN CHARACTER ROM'BLOW
6050 POKE 56334,PEEK(56334)AND 254
     :POKE 1,PEEK(1)AND 251'GABL
6070 FOR C=0 TO 127:FOR X=0 TO 7'GJEK
6080 B%(X,C)=PEEK(SA+X+C*8):NEXT
     :NEXT'HQJO
6099 REM SWITCH IN I/O & TURN
     KEYBOARD BACK ON'BFTA
6100 POKE 1,PEEK(1)OR 4
     :POKE 56334,PEEK(56334)OR 1'GVXH
6130 B%(1,49)=56:B%(2,49)=24'CVPH
6140 RETURN'BAQD
6200 REM PRINTS BIG LETTERS'BQYF
6210 FOR WD=1 TO NL:W$=W$(WD)'EOLH
6212 IF W$=""THEN 6355'DGYG
6230 FOR Y=1 TO LEN(W$)'EGOG
6240 L$(Y)=MID$(W$,Y,1)
     :C=ASC(L$(Y))'EWNL
6250 IF C>64 THEN C=C-64
     :IF C>127 THEN C=C-64'KQKP
6260 FOR X=0 TO 7:P(X,Y)=B%(X,C):NEXT
     :NEXT'GTVN
6270 T=40-LEN(W$)*(2+2*D):A%=T/10+48
     :B%=T-(A%-48)*10+48'OJVX
6290 FOR X=0 TO 7:PRINT#4,'EGYM
6300 IF C$="Y"THEN PRINT#4,
     CHR$(16)CHR$(A%)CHR$(B%);'HRIJ
6310 FOR Y=1 TO LEN(W$)'EGOF
6320 FOR PW=7 TO 0 STEP-1'FFFH
6330 IF P(X,Y)<>(P(X,Y)OR 2^PW) THEN
     PRINT#4,S$(D);:NEXT
     :GOTO 6350'JGPQ
6340 PRINT#4,L$(Y*D);:NEXT'DKXI
6350 NEXT:NEXT'CBLH
6355 PRINT#4,:PRINT#4,:NEXT'DGEN
6360 RETURN'BAQH
```

END

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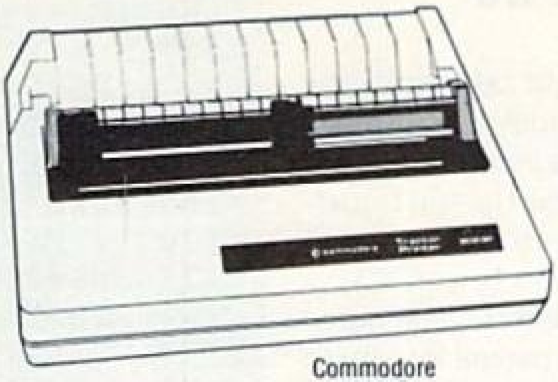
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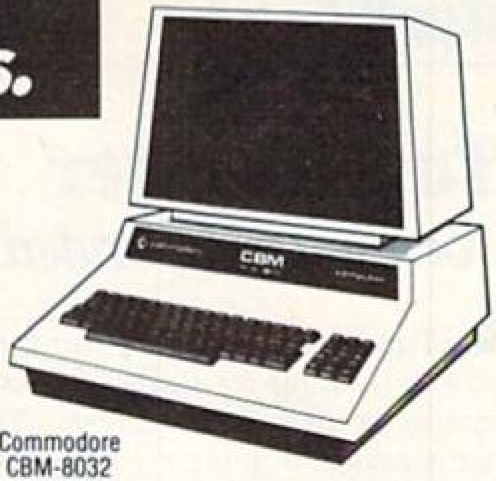
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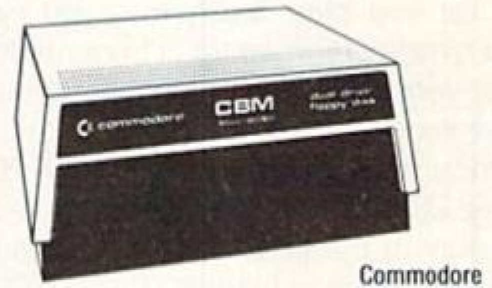
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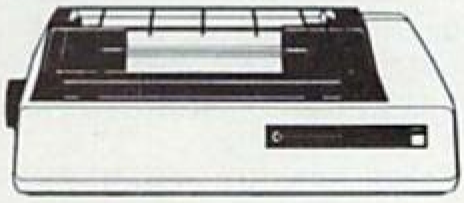
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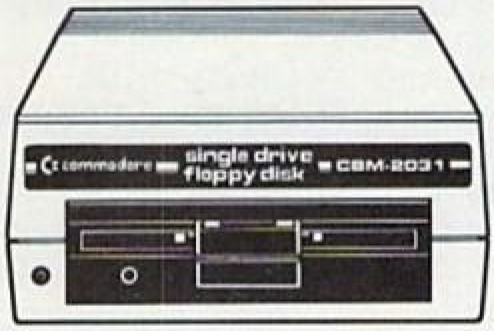
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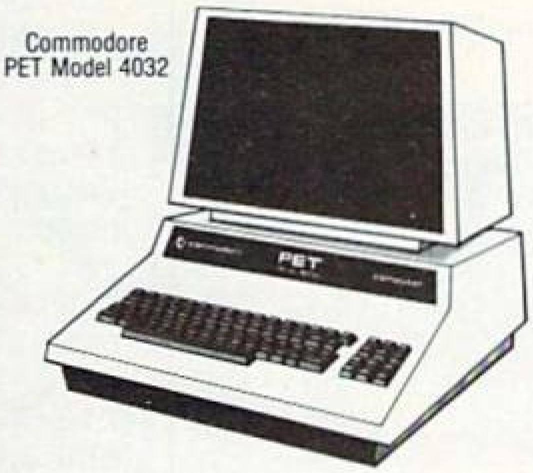

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Top Shooter

for the Unexpanded VIC 20

In Top Shooter you are firing from the bottom of the screen, aiming for three targets that move across the screen at different intervals. There are four different point values, depending on where you hit the top target. You can hit all four in one shot if you are good enough and your timing is right.

After you play the game, you can enter your name next to your high score. There are four places for you to enter your top scores. After that you have to beat one of those scores to enter your name.

Once the game is run, the RUN/STOP key is disabled in line 20, so nothing can happen to the scores, and they will stay in the program. There is a loop at lines 2000 to 2090 that goes to lines 4000 to 4250, so the game can be run without any burn in on the TV screen while it is waiting to be played again. The keys F1 and F7 are used. F1 is used to start the game and also to reset once the game is in play. F7 is used to fire at the target. The basic playing time of the game is two minutes, but if you are good enough, you can gain bonus points, extra time and extra life.

NOTE: When entering your name, enter your first name only or a maximum of seven characters. Otherwise the screen display may be disrupted. ■

Before typing this program, read "How to Enter Programs."
Do not use the Magazine Entry Program with this program.

Top Shooter

```
10 GOTO 5000:
20 S=0:H=0:POKE 36879,8:POKE 808,114
   :PRINT CHR$(5)
30 TI$="000000":YY=0
40 POKE 36876,0:GOTO 1000
50 X=X-1:B=B-1:G=G+1:X2=X2-1:Y=Y+1
   :X3=X3+1:B2=B2+1
60 IF G>78 THEN G=77
70 IF Y=7788 THEN POKE Y-1,32:Y=7746
80 IF X3=8009 THEN POKE X3-1,32
   :X3=7815:B2=7811:
90 IF X<7681 THEN POKE X,32:POKE B,32
   :POKE B+1,32:POKE B-1,32:GOTO 300
100 POKE X2,81:POKE X,G:POKE B,32
    :POKE X3,127:POKE B2,32
    :POKE X3-1,32
110 POKE Y,90:POKE Y-1,32:
120 POKE 8129,102:POKE F,M
    :POKE 8131,102
125 IF A$=CHR$(136)THEN 140
130 PRINT"[HOME,DOWN18] [RVS,YELLOW]
    "TI$"[LEFT7]TIME""[RIGHT9]MAX 200"
135 GET A$:
140 IF A$=CHR$(136)THEN F=F-22
    :POKE F+22,32:
150 IF A$=CHR$(133)THEN PRINT "RESET
    GAME":POKE SH,241
153 IF A$=CHR$(133)THEN FOR T=15 TO 0
    STEP-.1:POKE SV,T:NEXT:GOTO 20
155 IF F<7690 THEN F=8130:POKE 198,0
    :M=90:GOTO 135
160 IF F<>X2 OR F-22<>X2 THEN 170
163 S=S+275:PRINT"[HOME,RVS]275"
    :POKE F,86
164 FOR T=15 TO 0 STEP-.1:POKE SN,230
    :POKE SV,T:NEXT
165 POKE SN,0:GOTO 1000
170 IF F<>X OR F-22<>X THEN 180
173 S=S+200:PRINT"[HOME,DOWN2,RIGHT2]
     200":POKE F,86:FOR T=15 TO 0
    STEP-.08:POKE SN,238
175 POKE SV,T:NEXT:POKE 198,0
    :POKE SN,0:GOTO 1000
180 IF F<>Y OR F-22<>Y THEN 185
183 S=S+285:PRINT"[HOME,RVS]285"
    :POKE F,86:FOR T=15 TO 0 STEP-.1
184 POKE SN,220:POKE SV,T:NEXT
    :GOTO 1000
185 IF F<>X3 OR F-22<>X3 OR F<>X3+1
    THEN 190
187 S=S+95:POKE F,86:FOR T=15 TO 0
    STEP-.1:POKE SN,215:POKE SV,T:NEXT
    :GOTO 1000
190 IF F=X2+1 THEN S=S+100:POKE F,86
    :FOR T=1 TO 500:NEXT:POKE 198,0
    :GOTO 1000
210 IF S>6000 AND S<6800 THEN
    TI$="000059":PRINT"[HOME,DOWN17,
    RED,RVS]EXTRA TIME":
220 IF S>8800 AND S<9300 THEN S=S+600
    :PRINT"[HOME,RVS,GREEN,DOWN17]
    BONUS 600"
230 IF S>25000 AND S<25600 THEN
    S=S+660:PRINT"[HOME,RVS,GREEN,
    DOWN17]BONUS 600"
240 IF S>10100 AND S<10800 THEN
    TI$="000000":PRINT"[HOME,DOWN17,
    RED,RVS]EXTRA LIFE":
250 IF S>19000 AND S<19500 THEN
    TI$="000000":PRINT"[HOME,RED,RVS]
    BONUS 600":S=S+600:PRINT"[GREEN]
    BONUS TIME":
260 IF S>30000 AND S<30700 THEN
    TI$="000000":PRINT"[HOME,DOWN17,
    RED,RVS]EXTRA LIFE":
270 IF S>H1 AND YY<1 THEN S=S+1000
    :PRINT"[HOME,RED]BONUS [RVS]1000"
    :FOR T=1 TO 900:NEXT:YY=YY+1
    :GOTO 1000
280 IF TI$>"000201"THEN FOR T=1 TO 20
    STEP+.1:POKE SA,230+T:POKE SV,15
    :NEXT:POKE SA,0:GOTO 2000
290 GOTO 50
300 X=7745:B=7747:X2=7744:GOTO 110
1000 PRINT"[CLEAR,DOWN21]":POKE SN,0
1010 PRINT"[HOME,DOWN21,RVS,GREEN]
     SCORE [RVOFF,YELLOW]"S
1020 PRINT"[HOME]":POKE 198,0
1025 IF BP>7 THEN BP=0
1030 BP=BP+1:
```

```
1040 IF BP=7 AND S>5000 THEN S=S+300
     :PRINT"[HOME,RED]BONUS [RVS]300
     [RVOFF]":BP=0:FOR T=1 TO 900:NEXT
     :GOTO 1010
1999 GOTO 50
2000 PRINT"[RED]*-*-*-*-*-*-*-*-*-*"
2010 PRINT"[SPACE4]G A M E[SPACE2]
     O V E R "
2020 PRINT"[DOWN,YELLOW]SCORE WAS
     [GREEN]"S:PRINT"[WHITE,DOWN]KEY
     [RVS]F1[RVOFF] NEW GAME"
2030 GET A$:
2040 IF A$=CHR$(133)THEN POKE SV,15
     :POKE 36876,241:GOTO 20
2050 IF H=1 THEN 2070
2060 IF S>H1 OR S>H2 OR S>H3 OR S>H4
     THEN H=H+1:GOTO 3000
2070 X=7745:X2=7744:X3=7815:B=7747
     :B2=7811:F=8130:Y=7746:M=90:G=77
2090 FOR T=1 TO 1500:NEXT T:GOTO 4000
3000 IF S>H1 THEN N4$=N3$:H4=H3
     :N3$=N2$:H3=H2:N2$=N1$:H2=H1:
3010 IF S>H1 THEN PRINT"[CLEAR]
     ENTER NAME[SPACE2,DOWN]"
     :INPUT N1$:H1=S:GOTO 4000
3015 IF S>H2 THEN N4$=N3$:H4=H3
     :N3$=N2$:H3=H2
3020 IF S>H2 THEN PRINT"[CLEAR]
     ENTER NAME[SPACE2,DOWN2]"
     :INPUT N2$:H2=S:GOTO 4000
3025 IF S>H3 THEN N4$=N3$:H4=H3
3030 IF S>H3 THEN PRINT"[CLEAR]
     ENTER NAME[SPACE2,DOWN2]"
     :INPUT N3$:H3=S:GOTO 4000
3040 IF S>H4 THEN PRINT"[CLEAR]
     ENTER NAME[SPACE2,DOWN2]"
     :INPUT N4$:H4=S:GOTO 4000
4000 PRINT"[CLEAR,YELLOW]
     *********************"
4010 PRINT"[DOWN,RVS,CYAN] T O P
     [SPACE2]S H O O T E R "
4020 PRINT"[DOWN]*********************
     *"
4030 PRINT"[PURPLE]HIGH SCORES[WHITE]"
4040 PRINT"[DOWN2,RIGHT3]1 "N1$" "H1
4050 PRINT"[DOWN2,RIGHT3]2 "N2$" "H2
4060 PRINT"[DOWN2,RIGHT3]3 "N3$" "H3
4070 PRINT"[DOWN2,RIGHT3]4 "N4$" "H4
4210 FOR T=1 TO 1500:NEXT:
4220 IF A$=CHR$(133)THEN S=0:GOTO 20
4250 GOTO 2000
5000 IF H1=0 THEN H1=3000
     :N2$="[WHITE]F7 TO FIRE[CYAN]"
     :N3$="[WHITE]F1 TO RESET[CYAN]"
5020 X=7745:X2=7744:X3=7815:B=7747
     :B2=7811:Y=7746:F=8130
5040 M=90:BP=0:G=77:S=0:H=0
5060 SN=36877:SV=36878:SH=36876
     :SA=36875
5080 POKE 36879,8:POKE 808,114
5100 TI$="000000":
5120 PRINT CHR$(5);CHR$(19)
5190 GOTO 2000
```

END

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BY JERRY A. STURDIVANT

INSTR for the Commodore 128

INSTR. In-String. This command provides a fast way of searching for one string in another string, and should be considered a variable.

For example, in the statement P=INSTR(A$,B$), if B$ is found within A$, then P will equal the number of the position in which B$ is found. If it is not found, then P equals zero.

Let's look at an example:

```
10 A$="ABCDEFGHIJK"
20 B$="DEF"
30 P=INSTR(A$,B$)
40 PRINT P
```

In this case, P will equal four because B$ was found starting at the fourth position of A$.

There is one more thing we can add to the INSTR variable. We can tell it not to start looking until part way through A$. In the example program above, for instance, if we change line 30 to P=INSTR(A$,B$,5), the program will not start looking until it gets to the fifth position, or the letter E. As a result, P will equal zero because the program will not find "DEF."

Keyword Search

Here is a use for INSTR. I keep the titles of computer magazine articles in my computer. If I wish to go back and reread an article, find all articles on a given subject, or find an article whose title I'm not sure of, then I need to search all the titles for a keyword. Even if I don't know the exact title of the article, I can have all the article titles with the magazine titles and dates print to the screen for these entries that contain the keyword.

For example, if I want all the articles about joysticks, I use the search word JOYSTICK or just JOY. The routine takes the word and checks all the titles to see if they contain the word JOY. If it does, it prints it, along with the magazine and date.

Listing 1 contains an example of the program. In line 50, if INSTR does not find a match, then INSTR will equal zero and the IF/THEN statement is not true. There will be no printout. Any number other than zero will make it true, and will cause a printout.

Now if I remember having read an article about a banner program that prints large letters on the printer, I need only search the keyword BANNER, or just BAN.

I added the asterisk to the data so I could print all the titles to the screen by searching the keyword "*".

You may want to prefix your titles by using the first nine positions to describe the article, such as SOFTWARE, JIFFIES or TUTOR:

```
100 DATA SOFTWARE MICRO ASTROLOGER
    *,COMMODORE APR/MAY '85
120 DATA JIFFIES      PROGRAM BOOT FOR
    THE 64*, COMMODORE APR/MAY '85
140 DATA TUTOR        BIT BANNER *,
    COMMODORE APR/MAY '85
```

The INSTR statement in BASIC 7.0 makes programming keyword searches and input control easier than ever.

In this case, you might want your INSTR statement to skip the first nine positions and start on the tenth position:

```
50 IF INSTR(T$,K$,10) THEN PRINT T$:PRINT
   M$:PRINT
```

Be sure to leave nine spaces, even if you don't use them all, as in line 140.

Month Input

Another use for INSTR is for control of input. If you want the user to input a date, you can easily turn the month into its number, using Listing 2.

If the user misspelled the month, you would still get the proper information. If the misspelling occurred in the first three letters, they would get another chance.

Listing 1. Keywords

```
10 NT=5 : REM NUMBER OF TITLES
20 INPUT"ENTER KEY WORD";K$ :PRINT
30 FOR I=1 TO NT
40 READ T$,M$
50 IF INSTR(T$,K$) THEN PRINT T$
   :PRINT M$:PRINT
60 NEXT
70 PRINT "SEARCH COMPLETE"
80 RESTORE
90 GOTO 20
100 DATA MICRO ASTROLOGER *,
    COMMODORE APR/MAY 1985
110 DATA DESIGNER'S PENCIL *,
    COMMODORE APR/MAY 1985
120 DATA PROGRAM BOOT FOR THE 64 *,
    COMMODORE APR/MAY 1985
130 DATA BASIC RENUMBER *,
    COMMODORE APR/MAY 1985
140 DATA BIT BANNER *,COMMODORE
    APR/MAY 1985
```

END

Listing 2. Month Input

```
10 D$="XXJANFEBMARAPRMAYJUNJULAUGSEPO
   CTNOVDEC"
20 INPUT"ENTER MONTH";M$
30 M$=LEFT$(M$,3)
40 N=INSTR(D$,M$,3)/3
50 IF N=0 THEN 20
60 PRINT"THE NUMBER OF THE MONTH IS"N
```

END

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Last-Minute Gift Guide for the Computerist Who Has Everything

by Dan Gutman

Have you made out your Christmas gift list yet? Not many of us can afford to hand out Amigas to all our friends, but there are plenty of less expensive gifts that any Commodore owner would love to see stuffed into a stocking on Christmas morning. So get a computer gift for your friends, get a computer gift for yourself, get a computer gift for your computer this year. If you can't think of that perfect present, maybe these pages will give you some ideas.

Tasty Technology

If you're exhausted from hacking the night away, hack off a hunk of this—the Chocolate Chip. It's a 54-gram bar of Belgian chocolate, molded into the shape of an integrated circuit. If you're sick of crunching numbers with Nestles Crunch Bars, this might be just what you need for a late-night pick-me-up.

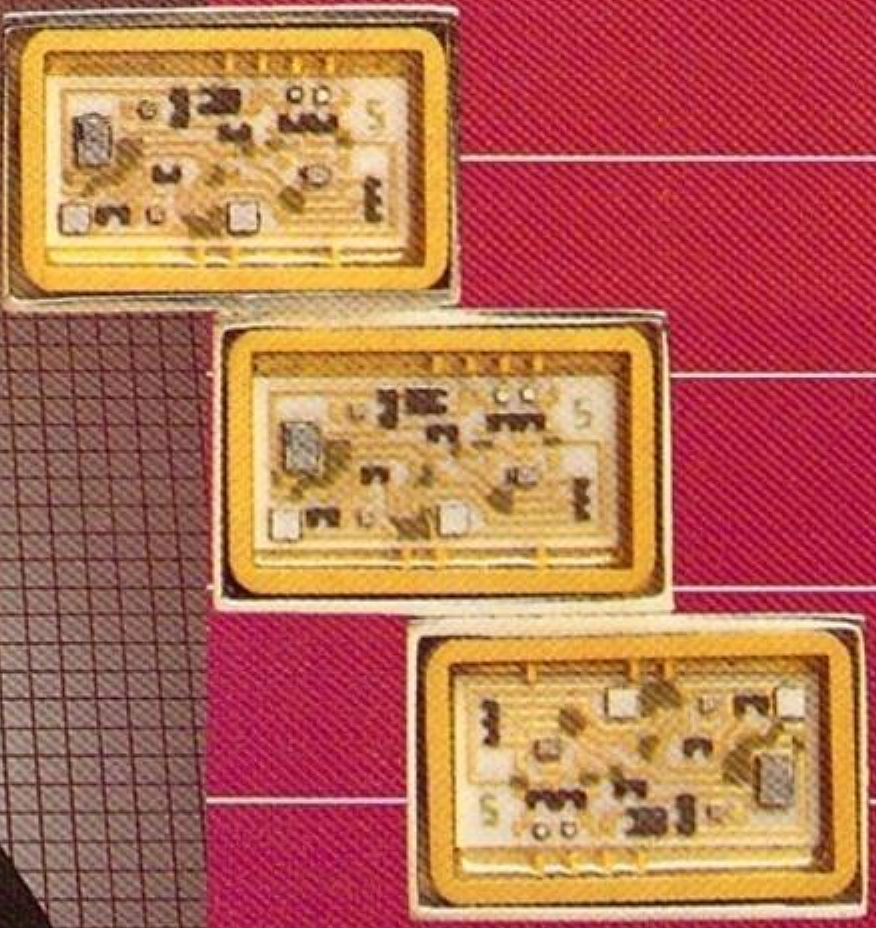
The Computer Museum, 300 Congress St., Boston, MA 02210. $5.95

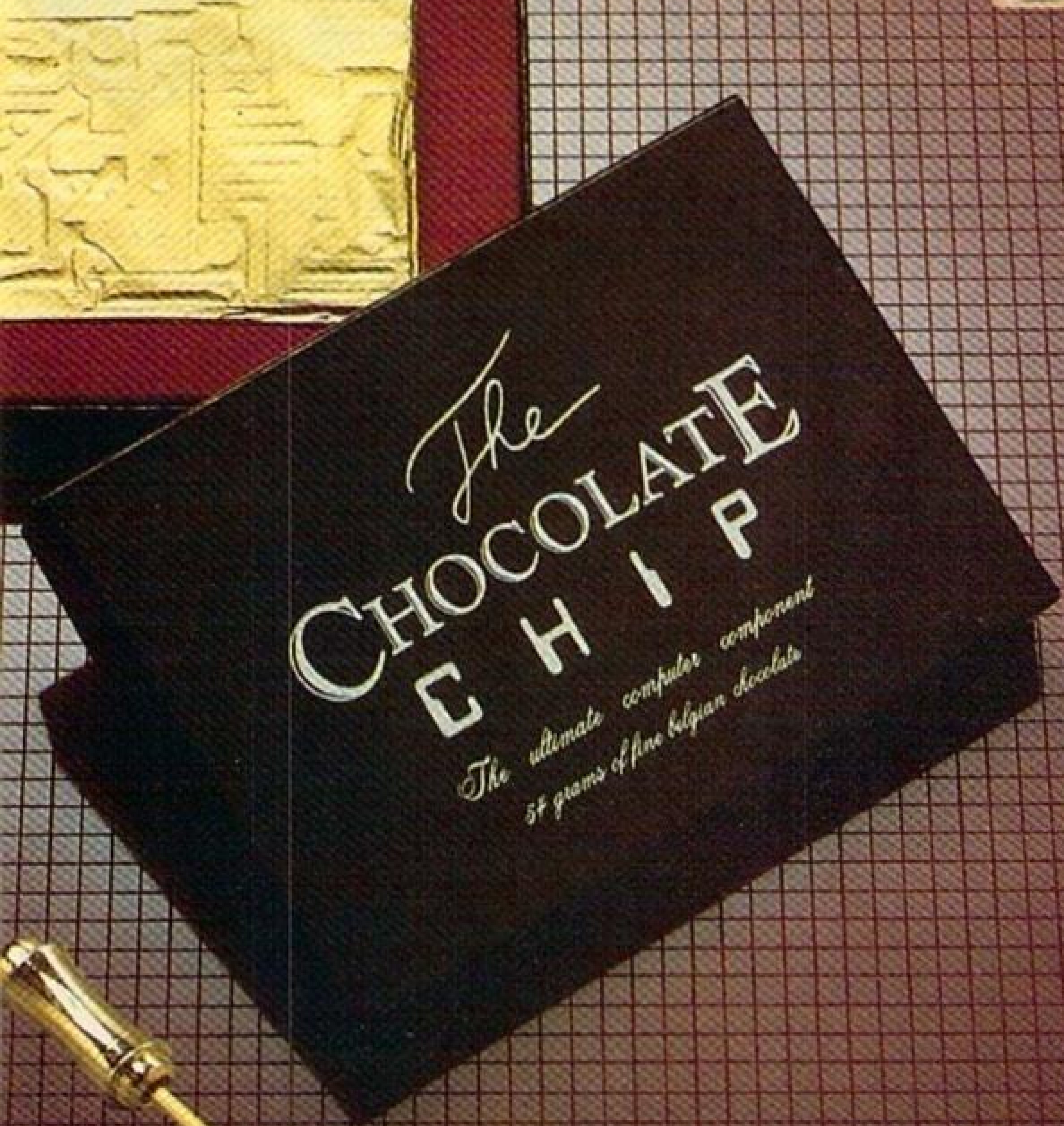
KeyFinder
PATENT NO. 21774/83
MADE IN HONG KONG

Excuse Me, Your Keys Are Beeping

Here's the ultimate gift for the absent-minded. The next time you lose your keys, just give a whistle. The Key Finder keychain contains a tiny speaker, receiver, and microchip programmed to respond to the key of D. It's sensitive up to 40 feet. If you live in a large house, learn to whistle loud.

KC Distributors Inc., P.O. Box 157, Richford, VT 05476. $14.95 plus $2 for postage and handling.

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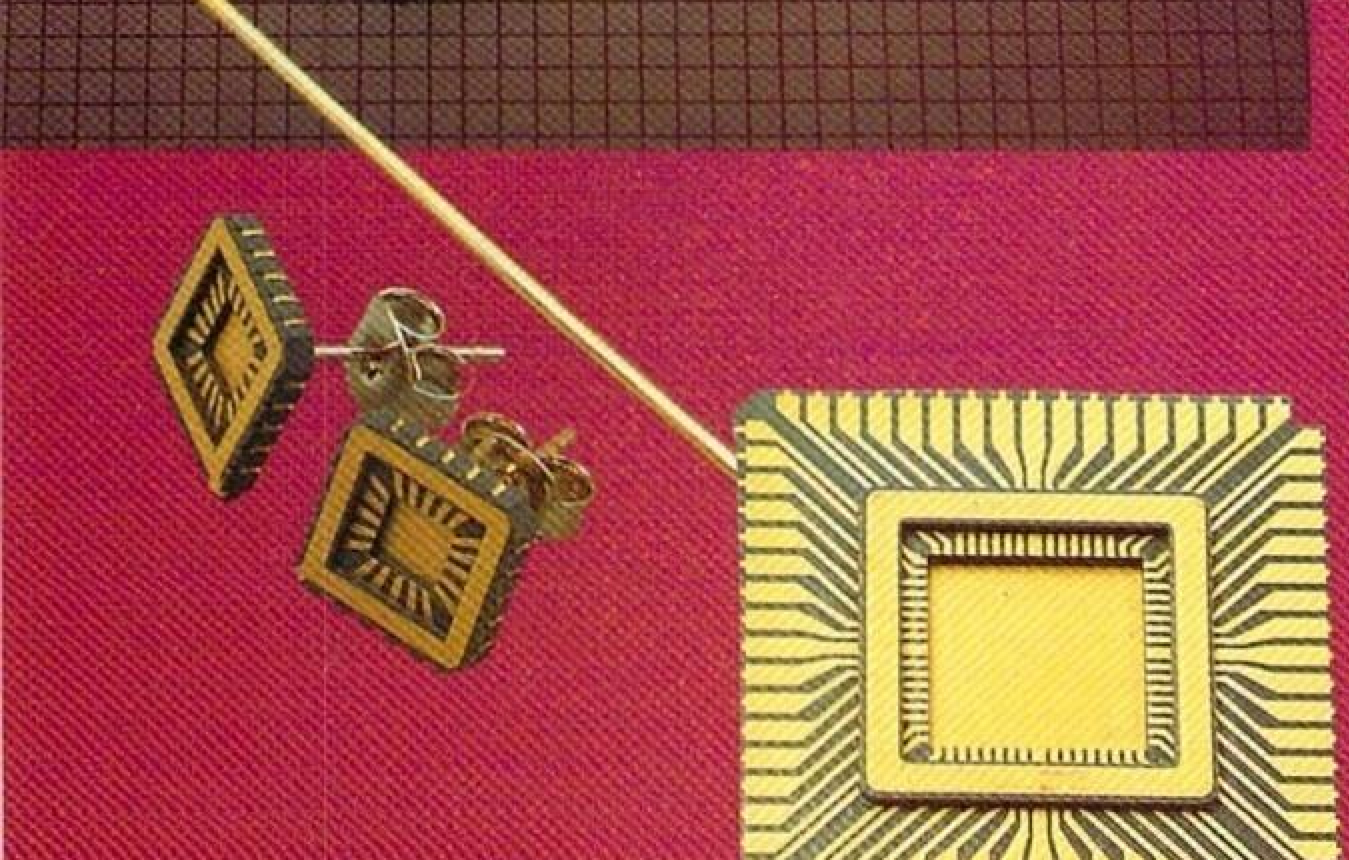


Memories Are Made of This

Wear your computer around your neck...or on your finger. The incredible Computer Museum in Boston sells all sorts of "micro chip jewelry" made of multiple layers of electronic circuitry built on tiny silicon crystals. The museum offers gold-plated earrings, pendants, tie tacks, cufflinks, necklaces, bracelets, and rings made by New York designers Nancy & Rise. Beware of high-tech chain snatchers.

The Computer Museum, 300 Congress St., Boston, MA 02210. Prices range from $12.50 to $585. Ask for their catalog describing dozens of other computer gifts.

Cool It

By the end of a marathon computing session, is your disk drive hot enough to fry an egg? Now you can take the heat off your drive with Com-Cool Plus. It's a combination fan and surge protector, all in the same unit. Com-Cool Plus is small, quiet, and no mounting or extra hardware is required. Fry eggs in your frying pan, not on your disk drive.

City Software, 735 W. Wisconsin Ave., Milwaukee, WI 53233. $79.95. $54.95 without surge protector.

com-cool
plus

The Time Machine

Dick Tracy never had anything like this! The Seiko PC Datagraph watch hooks directly up with your Commodore 64 or 128 and can upload or download a list of phone numbers, important addresses, your daily schedule of appointments, your grocery list, foreign language phrases you need to keep "on hand" while traveling, or even an electronic cheat-sheet for the big exam. You can also program it up to a year in advance to remind you of birthdays and anniversaries. The PC Datagraph stores 2K of information and displays it on a 24-letter readout. Oh, it tells time too.

Hattori Corp. Consumer Electronics, 1330 West Walnut Parkway, Compton, CA 90220. $199

No Static at All

Have you ever scuffed your feet over your carpet on a cold winter day? Have you ever watched your entire computer system blow up after you sat down and touched it? It's not a pretty sight. Staticide Wipes contain an antistatic solution that minimizes dust attraction to your CRT screen and also picks up the dirt that tends to accumulate there. These individually packaged towelettes are sort of like Wash "N Drys for your computer. You can also pick up a Glitch Kit, which contains two boxes of wipes and a quart of Staticide solution.

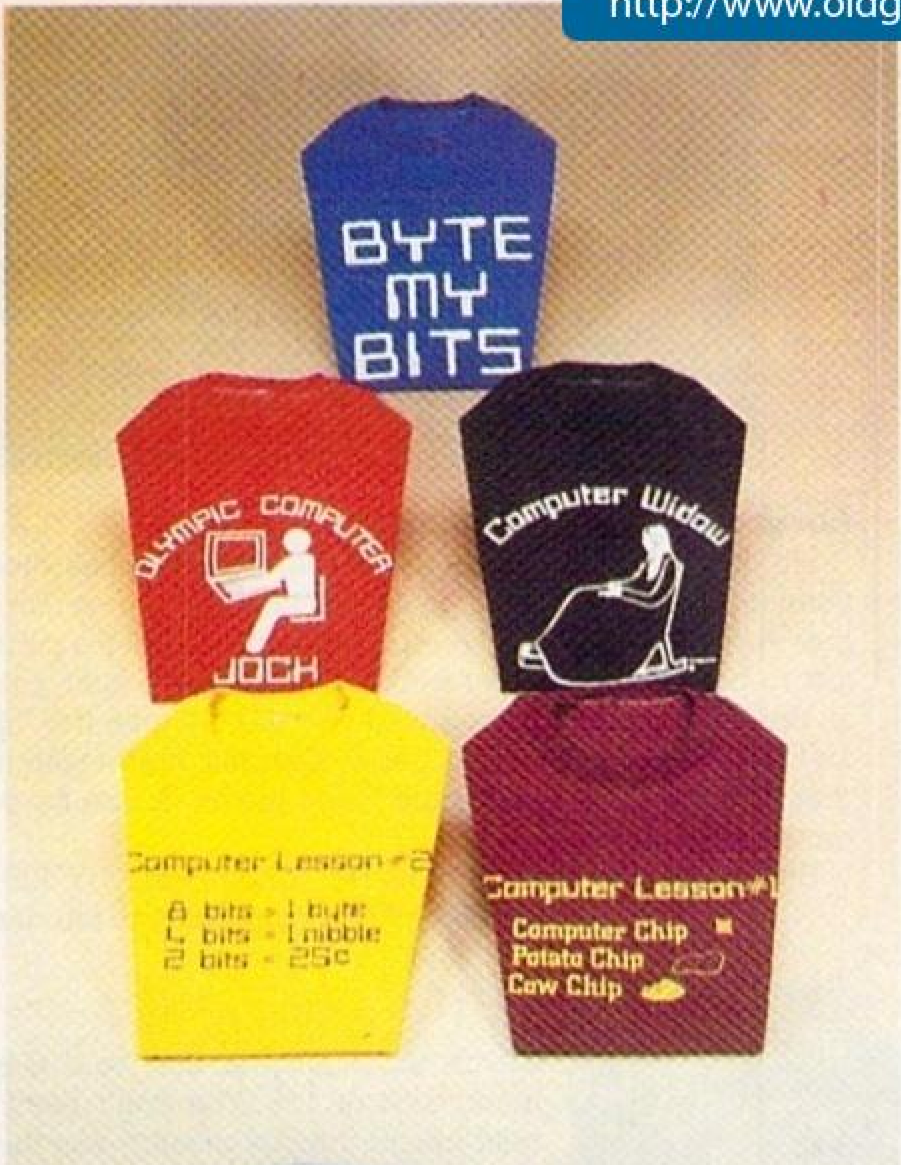
ACL Inc., 1960 East Devon Ave., Elk Grove Village, IL 60007. $5.48 for a box of 24 wipes. Glitch Kit costs $20.94.

Staticide WIPES
The towelette for cleaning and static control

If the Shoe Fits, Program It

It's pretty clear why somebody would want to plug a printer or disk drive into their computer. But a shoe? Now you can computerize your running with Puma's RS Computer Shoe. An electronic sensor in the heel of the left shoe records every time your foot hits the ground. There's also a tiny stop watch, so the shoe can record how long you ran, how far you ran, how fast you ran, and how many calories you burned. You can even set it to start beeping when you've run a predetermined distance. When you've finished running, go home and plug the shoe into your Commodore 64 or 128 with the cable provided. Colorful on-screen charts and graphs let you know your running progress. It's the ultimate high-tech gift for runners!

Puma USA Inc., 492 Old Connecticut Path, P.O. Box 1369, Framingham, MA 01701. $200



Soft Wear

Are you getting no respect from the other members of your user's group? Wait until you stride into the next meeting wearing a "Byte My Bits" T-shirt! That will show them! Nice colors. 50% cotton/50% polyester, and 100% made in the U.S.A. The perfect gift for all computer lovers with a sense of humor. Available in S, M, L, and XL sizes. Compatible with all computers, and most humans.

Sweet Gum, 15490 N.W. 7th Ave., Miami, FL 33169. $8.95 each plus $2 for shipping and handling. Don't forget to specify the size.

The Magic Wand

If you like light pens, you'll love "sound" pens. The Space Pen is a new input device that uses ultrasonic technology to move objects around the screen. The amazing thing is that you don't have to hold it against the screen—you can hold it up to six feet away! The receiver frame fits around your television set and the hand-held transmitter pointer plugs into the joystick port of your Commodore 64, VIC 20, or Commodore 128.

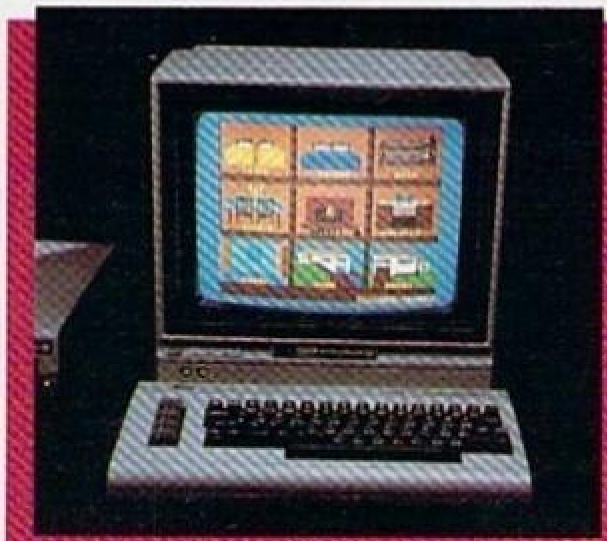
The Space Pen is perfect to move chess players on a board, place musical notes on a score, paint in space, position characters, and other applications that we can only imagine today. Imagine the baseball pitching game that somebody is going to develop! The Space Pen is already compatible with existing programs like *The Print Shop and Music Construction Set*. Computers have finally conquered the third dimension!

Soniture Inc., 480 Vandell Way, Campbell, CA 95008. $150

Sounds Good to Us

Commodore computers have been known for their beautiful music, so why not take advantage of it? The Melodian Keyboard plugs right into your 64 or 128, and will turn your living room into a multi-track recording studio. It's a 40-note polyphonic keyboard. The *ConcertMaster* software can simulate 16 different instruments and contains 35 familiar tunes, from Beethoven to Ghostbusters. Naturally, you can also play along with the music, write your own tunes, edit them, or just annoy the neighbors. Made by the people who helped Stevie Wonder on *I Just Called to Say I Love You*.

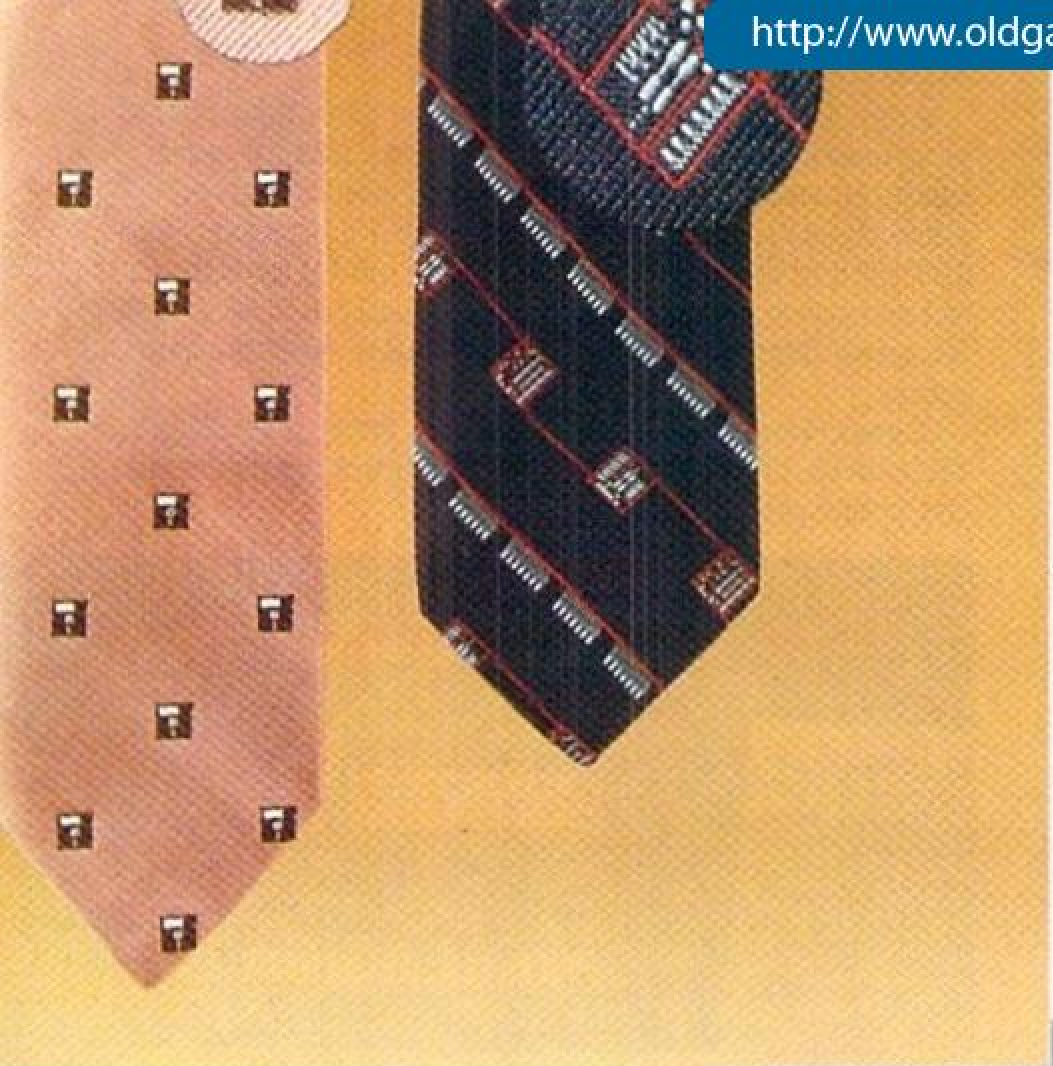
Melodian, Inc., 120 W. 58th St., New York, NY 10019. $149.95 including *ConcertMaster* software.



Lights Out, Uh-Huh

Now you can wake up and smell the coffee even before you get out of bed. The X-10 Powerhouse plugs into the user port of the Commodore 64 or 128 and can be used to control your lights and appliances. You can easily program just about anything to go on and off at any time of the day, and any days of the week. The X-10 Powerhouse will remember up to 128 events, and it doesn't tie up your computer while it controls the house. On-screen color graphics make it easy to install icons around the various rooms of your house. Powerhouse makes it easier to control your appliances, and it makes your home safe at the same time.

X-10 Inc., 185 LeGrand Ave., Northvale, NJ 07647. $125. Software and cables $25. Extra modules $20.



Look Behind the Beard

Ho, ho, ho. It seems as though Santa Claus has disappeared and there may be no Christmas this year. *A Christmas Adventure* is an adventure game that makes a perfect gift to ring in the holiday season. Set at Santa's ice castle at the North Pole, you've got to find the old guy, free him, and save Christmas. The game features high-resolution graphics, animated sequences, and music. It can be customized for each user.

BitCards Inc., 30 W. Service Rd., Champlain, NY 12919. $24.95 + $3 for shipping and handling.

Neck Peripherals

Say, isn 't that a spot on your tie? Oh, no, it's a miniature floppy disk pattern! Who knows, maybe next year the "Diskette Tie" and the "Microchip Tie" will be all the rage in Paris fashion salons. On second thought, maybe not. But why take chances? Get one today and start the trend. Make a fashion statement! Save it! Print it out! They'll never call you a computer nerd again (at least not to your face).

Sweet Gum, 15490 N.W. 7th Ave., Miami, FL 33169. $14.95 each plus $2 for shipping and handling.

VOICE MASTER
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Song Sung Software

Imagine humming a tune into a microphone and seeing the "sheet music" of that tune instantly appear on your screen. You can do it with the Covox Voice Master and your Commodore 64 or 128. You don't need to read music to write a song. You don't need to play an instrument, either. As long as you can hum, whistle, or grunt out a tune, you can be a composer. You can change the notes, change octaves, and fully edit your tune. When the song is perfect, listen to it (played by a banjo, xylophone, jaw harp or a dozen other instruments) and even tap a few keys to print out the sheet music on your printer.

Covox, 675-D Conger St., Eugene, OR 97402. $89.95

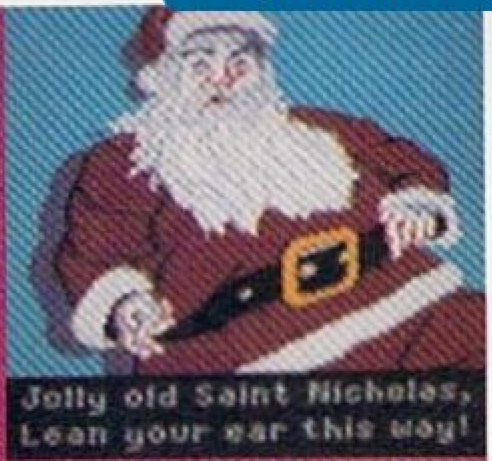
Elbow Room

Four out of five doctors agree that you can break your arm trying to plug and unplug Commodore 64 cartridges. Why did they stick the cartridge port back there anyway? The 'LBow EC-64 is a cartridge port converter that allows cartridges to be inserted vertically. Not only that, but it also has a reset button so you don''t have to keep flipping the AC power switch on and off.

T.I.E. Limited, 2061 West Mill Rd., Milwaukee, WI 53209. $19.95

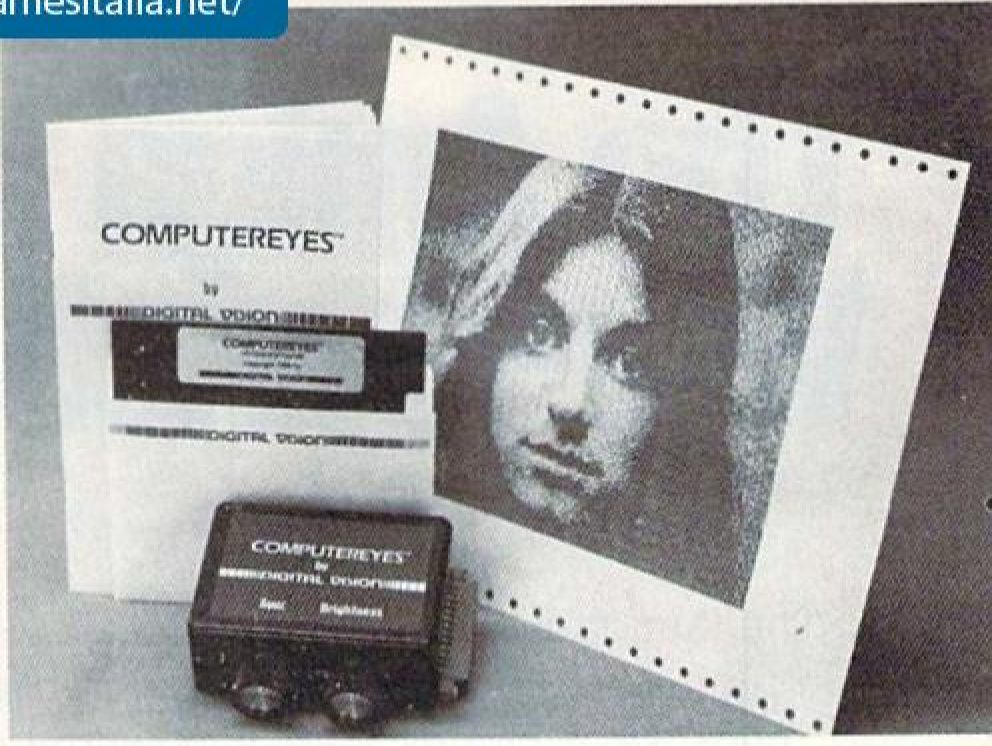
SEA WOLF
commodore 64
'LBow BY MARJAC
POWER
CLR HOME
INST DEL
RESTORE

Synthesized Santa


Jolly old Saint Nicholas,
Lean your ear this way!

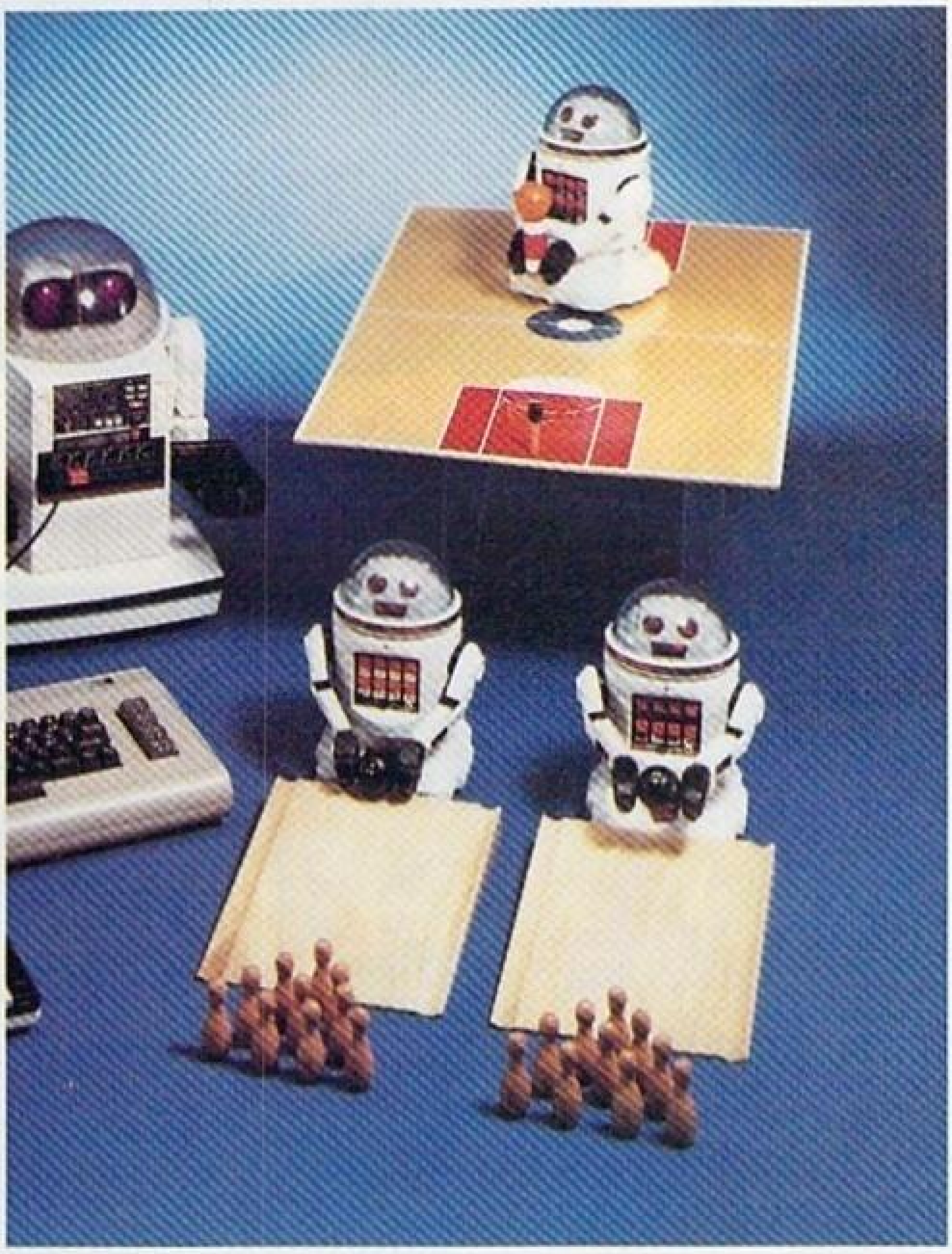
Your evening of Christmas caroling can be especially merry this year with *Christmas Carols*, a disk of computer-generated music. Eighteen different holiday songs are included, among them O Come All Ye Faithful, Deck the Halls, Jingle Bells, Silent Night and many others. You can play the songs continuously or in any order you'd like. The lyrics appear on-screen along with seasonal graphics. Also available: a sing-along program called *Party Songs*, which includes epics like "Who Threw the Overalls in Mistress Murphy''s Chowder?"

John Henry Software, 1252 Crestwood Hills Dr., P.O. Box 745, Vandalia, OH 45377. $15.95 plus $1 for postage and handling.



Photographs and Memories

Digital photography is here. Computereyes is a slow-scan device that connects between any standard video source and your Commodore's I/O port. Point a video camera at the world, and the black and white image appears on your computer screen. Amazing! The full grey scale images can be saved to disk, manipulated on the screen, and printed out on your printer. Computereyes can also be used with programs such as Broderbund's *The Print Shop*. Digital Vision, Inc., 14 Oak St. Suite. 2, Needham, MA 02192. $129.95 or $400 including video camera.



Take Me to Your Keyboard

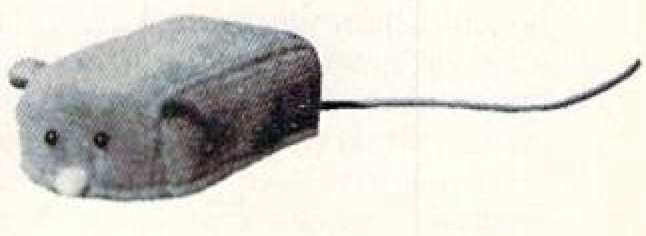
As everyone knows, the problem with computers is that they can't bowl. Well, they can *now*. Computer Magic's Robot*Link software package allows you to hook up your Commodore 64 or 128 to Tomy's Omnibot, Omnibot 2000, or Verbot robots. The computer communicates with the robot's programmable memory so you can write robot programs, save them, retrieve them, edit them, and mix them. Robot*Link comes with an interface cable and the software you'll need, not to mention a "Spin the Robot" game. Computer Magic also makes a Sonar Experimenter's Kit that hooks to your computer and allows you to do such things as wave your hand in the air and create music.

Computer Magic, 18 East Mall, Plainview, NY 11803. $40. Bowling and basketball are $25 each. Sonar is $110. ◼

Of Mice and Menus

Don't let your poor mouse freeze to death on those cold Christmas nights. Give it a home with Mouse-House, a furry little guy who fits snugly around any mouse. Give your computer some personality! Who can resist a mouse that actually has eyes, ears, and a nose? It just goes to show that if you build a better mouse house, the world will beat a path to your computer. Cheese and traps not included.

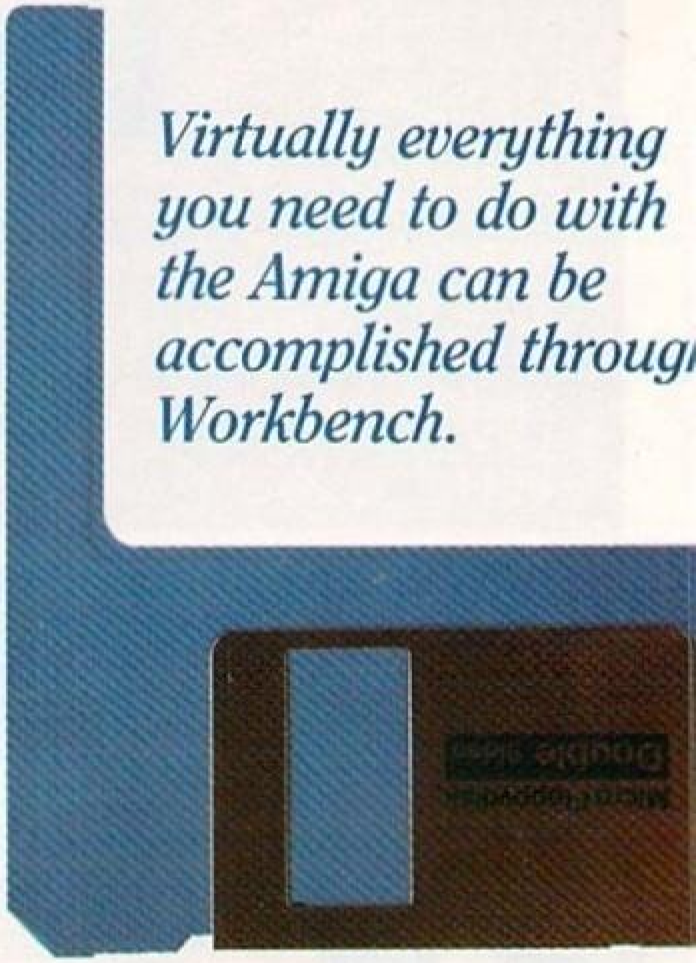
American Covers, 512 West 9460 South, P.O. Box 1796, Sandy, UT 84091. $6.95



The Amiga Workbench

by Jim Gracely, Technical Editor

The Amiga is a computer you can use as soon as you figure out how to connect the cables and plug it in, because it comes with a powerful software tool called Workbench. The name very closely describes what this program is used for. Like a workbench in your garage or basement, Workbench on the Amiga is a place where you can find tools and gadgets for a variety of jobs, projects and experiments. In this article we'll take a closer look at Workbench and see just what it can do.

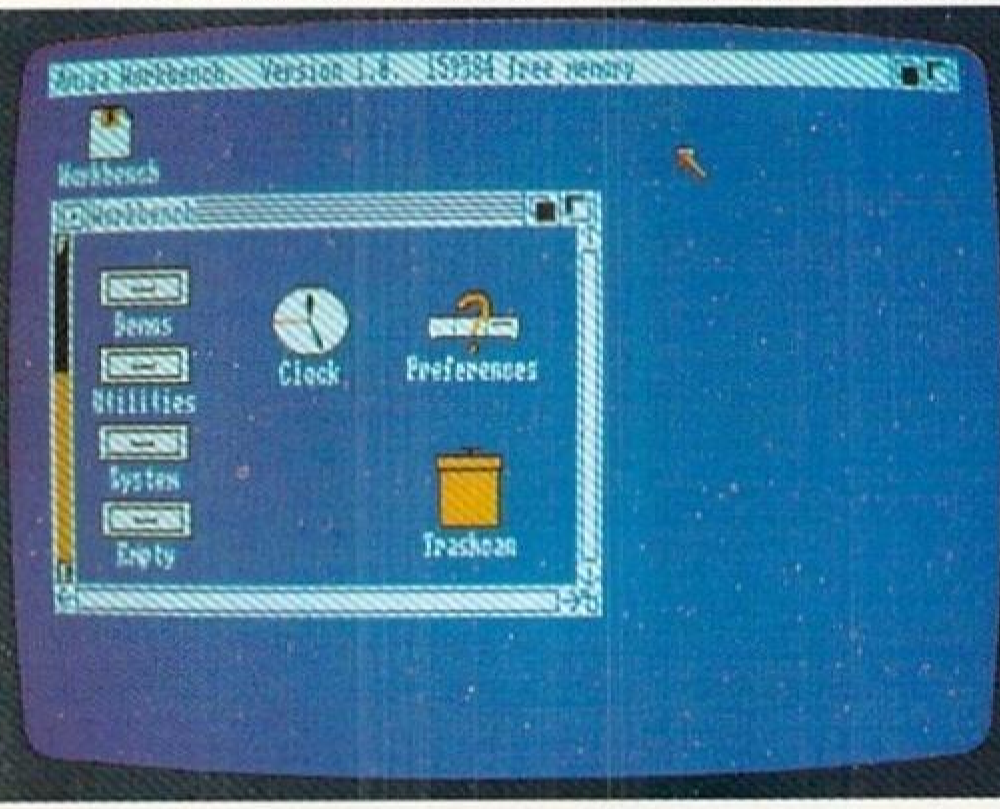


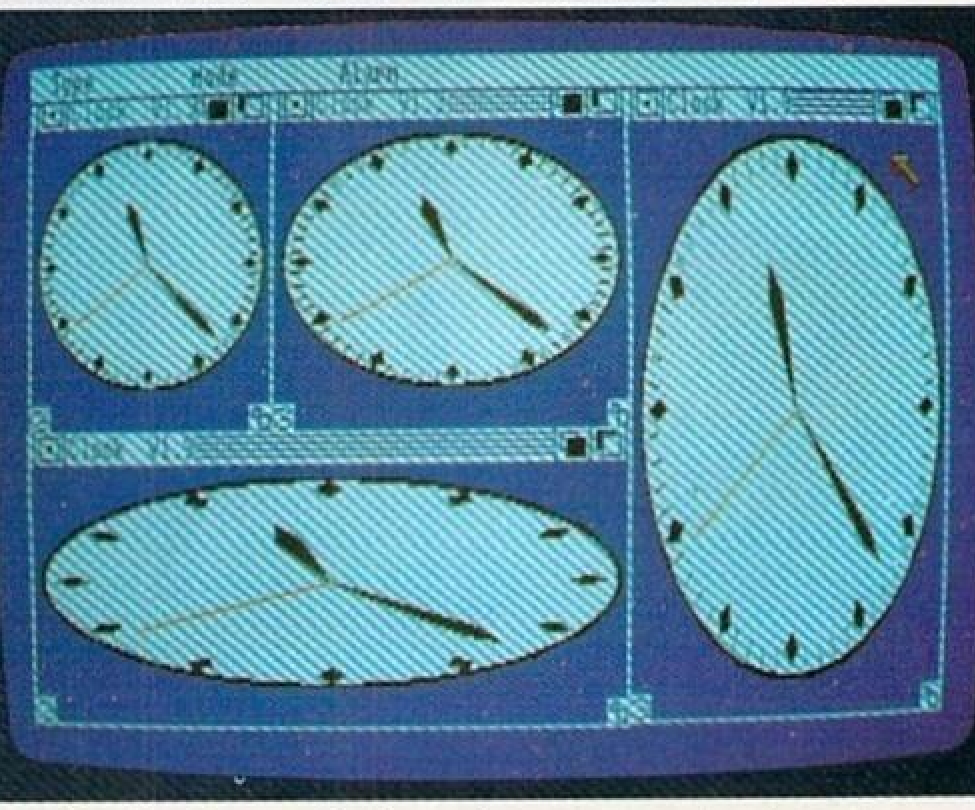
Virtually everything you need to do with the Amiga can be accomplished throug Workbench.

Workbench

Workbench is the iconic (picture) user operating system for the Amiga. Virtually everything that you need to do with the Amiga can be accomplished through its pictures and menus. When you first put the Workbench disk in the drive, a small disk icon will appear with the word Workbench under it. Pressing the left mouse button twice when the pointer is on this icon opens the Workbench window. You are now using Workbench. You will notice that this window has a number of icons in it. These icons represent a number of single tools (think of them as utility programs), and groups of tools. Simply pointing to an icon and pressing the left mouse button twice is all that is required to use many of the tools available.

On the left side of the window are four drawer icons labeled Demos, Utilities, System and Empty. These icons represent not a single tool but drawers containing a number of tools. The drawers are a convenient way to divide the tools into categories. Actually each drawer is a sub-directory on the disk (as is the trashcan icon). If you move the cursor to one of these drawers and press the left mouse button twice, that drawer will open up into a window.





AMIGA
AMIGA

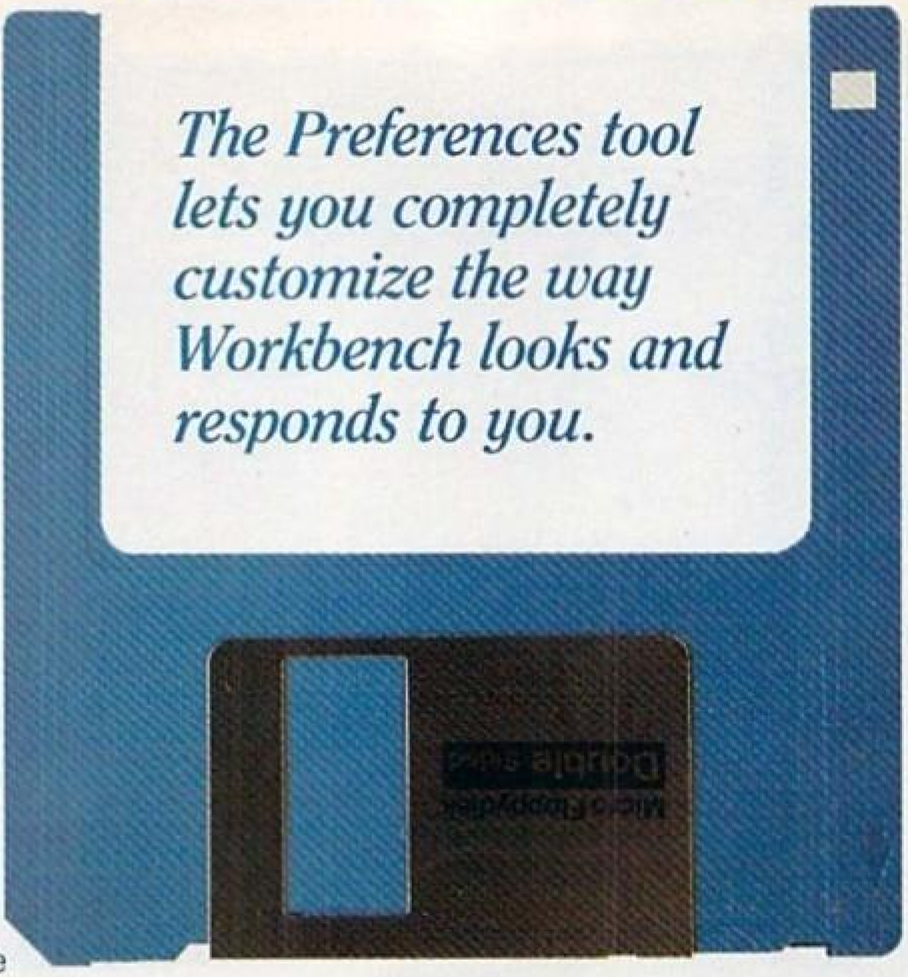
To the right of the drawers is the clock tool. This is simply a clock program that runs in its own window on the screen. You can set the time in the "preferences" screen. If you press the left mouse button twice on the clock, a window opens with a clock face running in it. You can set an alarm function, change to a digital clock and choose between a 12- and 24-hour mode, all with pull-down windows (press the right mouse button and move to the selection that you want at the top of the screen.

Below and to the right of the clock is the trashcan tool. This is used to discard or erase files or whole drawers of files (sub-directories) from the disk. You can move an icon by moving the pointer onto the icon and then moving the mouse while holding down the left button. The pointer will change to a crosshair and move around the screen. If you move the crosshair into the trashcan this way, the tool, drawer or file will be thrown away. Actually the file is stored on the disk in the trashcan sub-directory until you choose the Empty Trash item in the DISK pull-down menu. If you have accidentally thrown out a file and haven't emptied the trash, just select the trashcan tool and drag the icon back out of the window.

Preferences

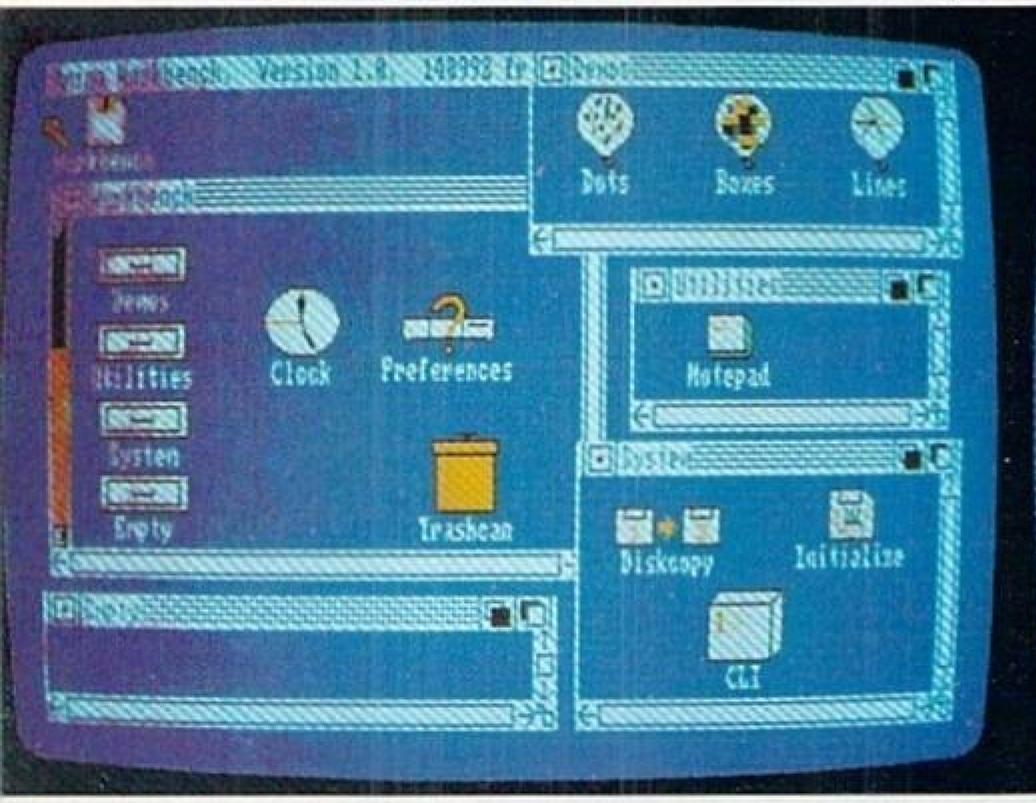
To the right of the clock is the "preferences" tool. This is a series of three screens that let you completely customize the way the Workbench looks and responds to you and to a printer.

The first screen allows you to select 60- or 80-column text, the speed at which the mouse moves, the centering of the screen and even all the colors to be displayed. You can set the current date and time so that any files you create or edit will be time-stamped with the correct date and time. This lets you customize the look and feel of Workbench.

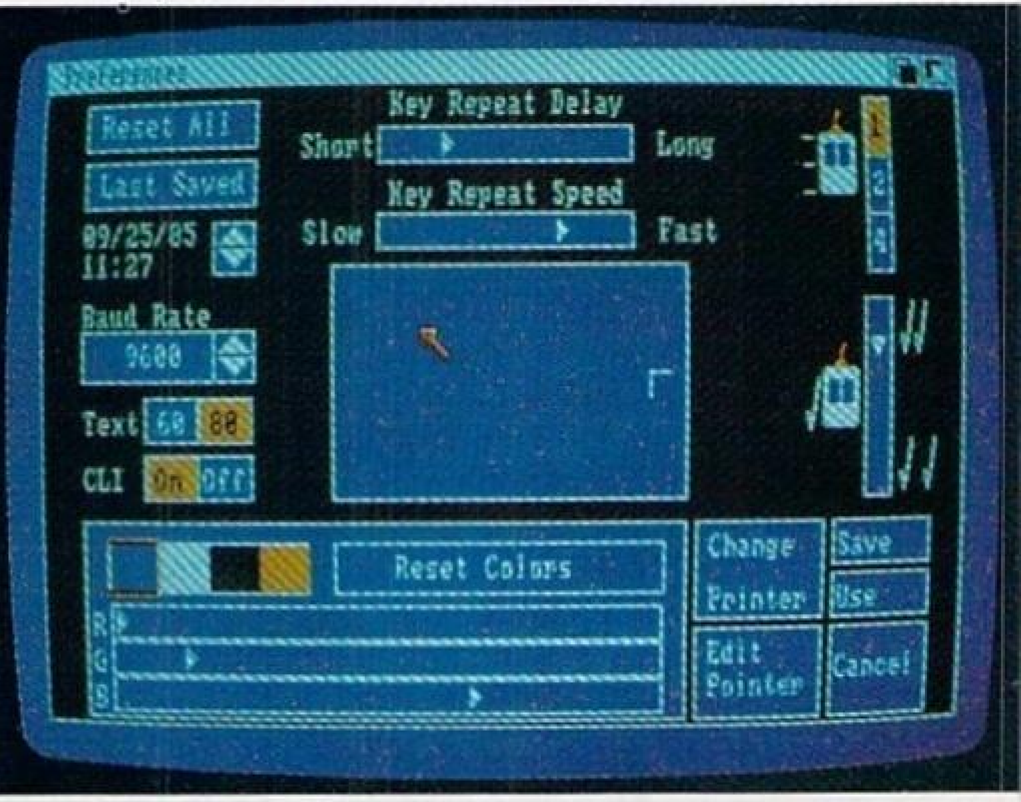


The Preferences tool lets you completely customize the way Workbench looks and responds to you.

Double sided
Micro Floppydisk



Workbench Version 1.0 148992 free
Demos
Dots
Boxes
Lines
Utilities
Notepad
System
Diskcopy
Initialize
CLI
Clock
Preferences
Trashcan
Empty



Preferences
Reset All
Last Saved
09/25/85
11:27
Baud Rate
9600
Text 60 80
CLI On Off
Key Repeat Delay
Short
Long
Key Repeat Speed
Slow
Fast
Reset Colors
R
G
B
Change Printer
Edit Pointer
Save
Use
Cancel

The second screen of the preferences tool is for printer selections. This screen allows you to define all the information for the printer you are working with. There are ten printers for which the Amiga has built-in drivers:

Alphacom Alphapro 101	Daisy wheel
Brother HR-15XL	Daisy wheel
CBM MPS-1000	Dot matrix
Diablo 630	Daisy wheel
Diablo Advantage D25	Daisy wheel
Diablo C-150	Color ink-jet
Epson FX-80/RX-80	Dot matrix
Epson JX-80	Color
Okimate 20	Color
Qume Letterpro 20	Daisy wheel

Of course other printers can also be used with a customized printer driver.

Other selections on this screen include paper size and type, pitch, spacing, quality and margins.

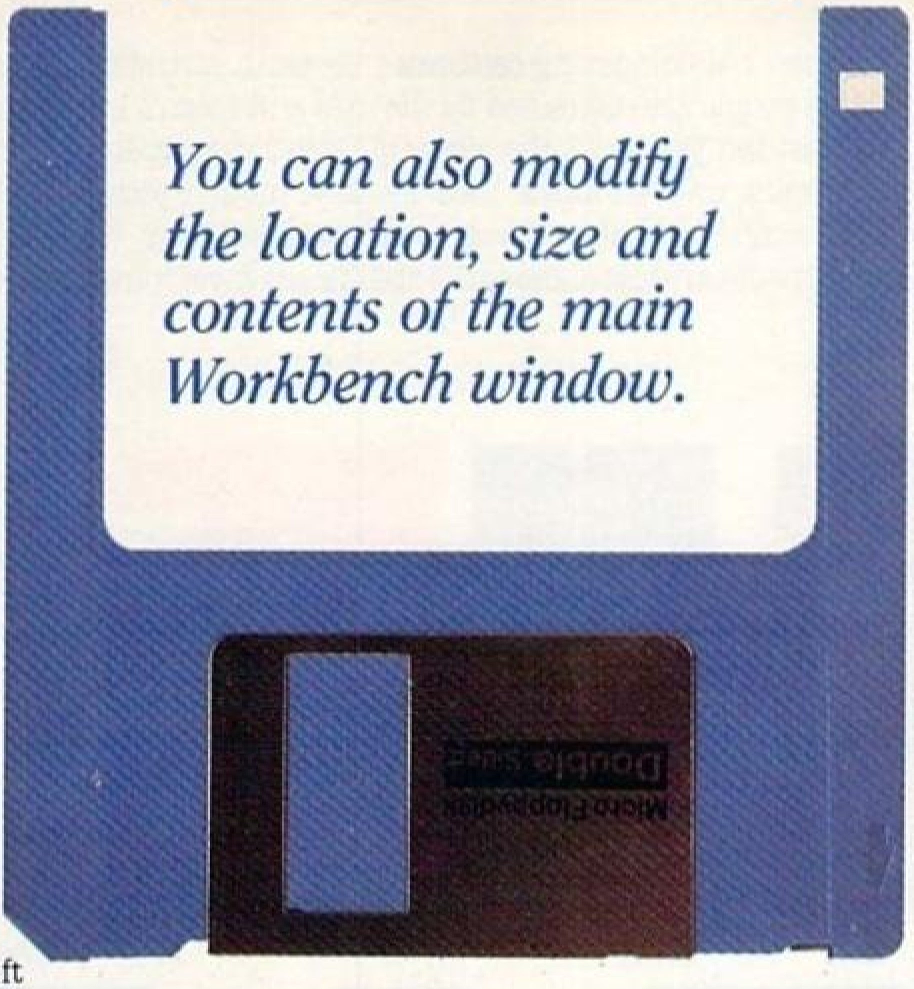
The third screen is used for defining how graphic images are to be printed (provided your printer is capable). Choices here include positive or negative images in either a horizontal or vertical position and the shading (color, black and white, or gray scale).

All the information from all three screens can be saved, so that from then on, whenever you insert the Workbench disk, your choices are the defaults.

What's In The Drawers?

The four drawers that are in the initial Workbench window (demos, utilities, system and empty) contain groups of tools that serve a variety of purposes.

The empty drawer doesn't have anything in it and is there for your own personalization. You will eventually want to rename this drawer. To do so, put the pointer on the empty drawer and press the left mouse button once (the drawer turns black on the default screen). Then, holding down the right mouse button, move to the top of the screen and pull down the Workbench menu. Select the RENAME item. A narrow window opens on the screen with the current name. Move the pointer into the window and click the left button once. Use the DEL key to erase the current name and then type your new name. Press RETURN to finish and save the



You can also modify the location, size and contents of the main Workbench window.

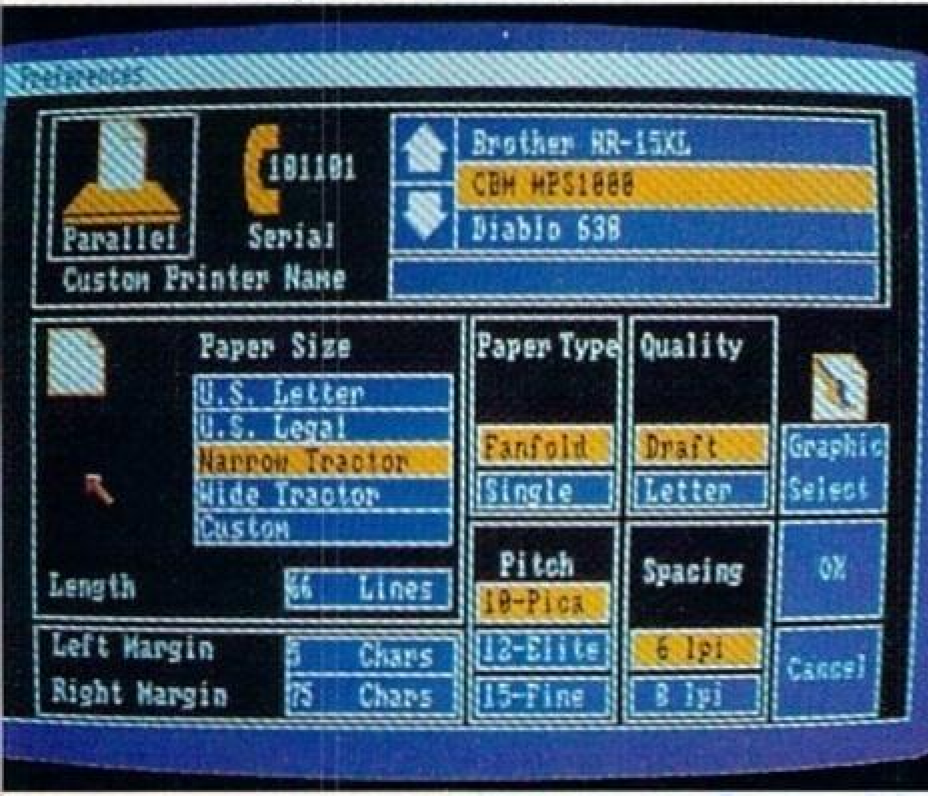
new drawer name. All the icons can be renamed this way. Now you can move whatever icons you want into your new drawer.

The "Demos" drawer contains three graphic demonstrations that you can play with. If you get all three running on the screen you can use them as an exercise in moving windows and playing with the window gadgets (changing size and priority).

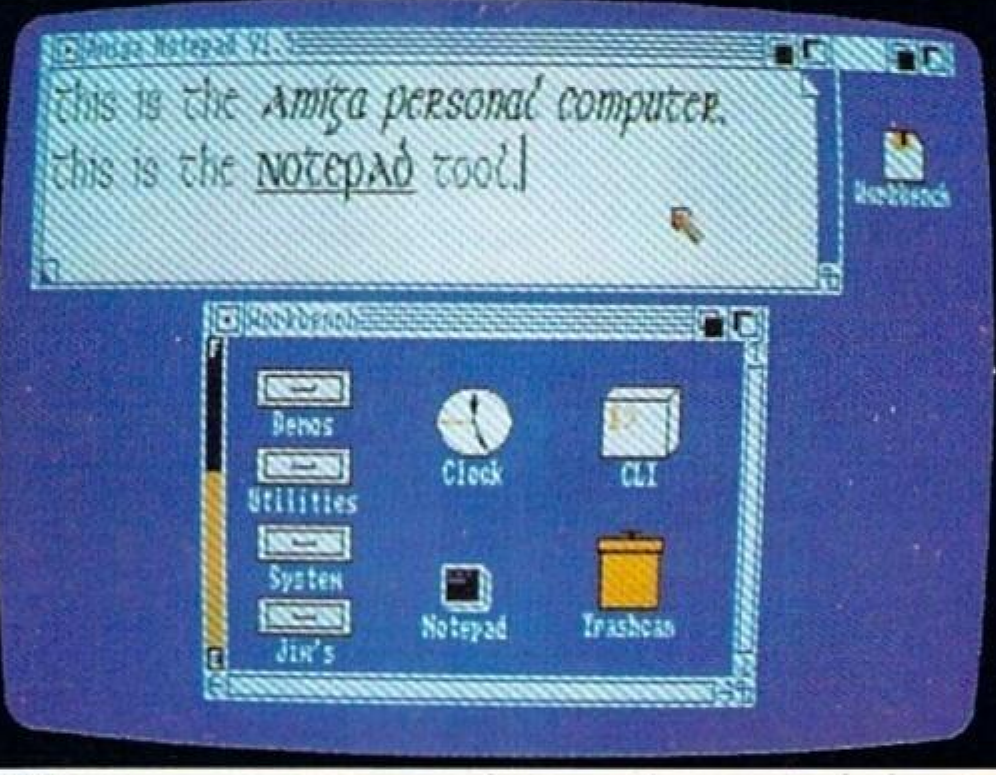
The "utilities" drawer contains the "notepad" tool. This is a simple notepad program for jotting down thoughts that you want to save. A window with a white (default) typing surface opens with a position pointer in the top left corner. The size of this pointer is the same as the font size you are currently using. Pull-down menus include options for changing fonts, loading, saving, and printing in various colors and sizes.

The "system" drawer normally contains two icons: Diskcopy and Initialize. The Diskcopy icon is for making duplicate copies of a disk using only one drive. The Initialize icon is for formatting a new disk. If you are duplicating an entire disk, there is no need to initialize it first. Initialize a disk when you want to save or copy individual files to it.

One additional icon is available in the "system" drawer. That is the CLI (command line interpreter) icon. In the "preferences" tool there is a little box that lets you choose CLI ON or OFF. This is OFF when you get your Amiga. If you switch this to ON, you will have the CLI available to you in the "system" drawer. The CLI is a very powerful command language similar in some ways to the CP/M or UNIX® operating system. To get all of the information on the CLI you will need to buy the AmigaDOS User's Manual.



Preferences
Parallel
101101
Serial
Brother HR-15XL
CBM MPS1000
Diablo 630
Custom Printer Name
Paper Size
U.S. Letter
U.S. Legal
Narrow Tractor
Wide Tractor
Custom
Paper Type
Fanfold
Single
Quality
Draft
Letter
Graphic Select
Length
66 Lines
Pitch
10-Pica
12-Elite
15-Fine
Spacing
6 lpi
8 lpi
OK
Left Margin
5 Chars
Right Margin
75 Chars
Cancel



Amiga Notepad V1
Workbench
Demos
Utilities
System
Jim's
Clock
Notepad
CLI
Trashcan

this is the Amiga personal computer.
this is the Notepad tool.

Customizing Your Workbench

In addition to all the customizing that you can do through the preferences tool, you can also modify the location, size and contents of the main Workbench window.

When you first load the Workbench disk, the disk icon appears on the screen. Selecting this icon is the way you open the Workbench window. You can move this icon around on the screen and place it anywhere that you like. Once you have it positioned, open the Workbench window. The Workbench window can be moved around the screen just like any other window. Don't forget you can drag icons from the drawers into the Workbench window and other drawers. (For instance, I like the Notepad tool in the Workbench window and the trashcan tool in the "utilities" drawer.)

Once you have the whole screen arranged, move the pointer to the Workbench disk icon and press the left mouse button once. Then press the right button and while holding it down move up to the SPECIAL window and select SNAPSHOT. This saves the organization of the screen to disk and from now on this is the way that the Workbench disk will load up.

Workbench is a software tool that makes using the Amiga easy for anyone regardless of their experience with other computers. It is also so varied and rich that we have only scratched the surface in this article. The only way to master anything, after all, is to use it! ■

Ten years. With the end of 1985, personal computing celebrates its tenth birthday. Like any industry in its infancy, things haven't settled down yet. Some people are distressed by the up's and down's in the computer market. They forget that when the movie industry was just ten years old, the close-up hadn't even been invented yet. There were no color movies, slow-motion, Dolby sound, Oscars, or even movie theaters. Like motion pictures at the turn of the century, the future innovations that will come to computing haven't even been imagined today. We're witnesses to the birth of it all, and it's very exciting. On the following pages are just some of the significant developments in computing that took place in 1985.

by Dan Gutman

THE YEAR IN COMP

In the News...

In the "early days" of computing, only the hackers, techies and real pioneers used computers. But now, computers are starting to play a part in the everyday life of people—even people who don't own computers. Here are a few of the interesting and unusual computer news stories of 1985.

- **The New York Public Library** (and many other libraries) put its massive card catalog on computer. Terminals were installed so people can look up just about any title in a few seconds, and even print out a hard copy of the listing.

- What do **Isaac Asimov, Bill Bixby, Dom DeLouise, Alan Alda, John Cleese, Roger Moore, Bill Cosby, Leonard Nimoy, Bruce Jenner, Jim Fixx, Ernest Borgnine, Sylvia Porter, Martina Navratilova, Mr. T., Dave Winfield, and Fred (Mr.) Rogers** have in common? All of them have worked with computer companies in some capacity.

UPI/Bettmann Newsphotos

Photo by Dan Gutman

- On Broadway, the show **"Cats"** used a computer to control 15,000 lights and 2,000 blinking cat eyes. The set is one of the stars of the show.
- **Michael Saenz** and **Peter Gillis** of First Comics created **Shatter,** the first comic book made with a computer. Shatter is a detective and soldier of fortune in a future world where technology has gone wild.
- After getting busted for tapping into a bank's computer, **15-year old Peter Leppik** helped Minneapolis police crack a child sex abuse case. The 37-year old suspect had stored the evidence on copy-protected disks. Police were puzzled for a month, but Leppik cracked the code in 45 minutes.
- A group of University of California students rigged up a computer, receiver, and transmitter and attempted to beat the odds at the roulette tables of Las Vegas. They failed, but their quest was chronicled in a book called **The Eudaemonic Pie.**
- The **Internal Revenue Service** got a new $100 million computer system to process tax returns. Unfortunately, the system had problems, and the IRS had to pay Americans $200 million in interest because the returns were processed so slowly.
- **Ray Bradbury, Arthur C. Clarke, Douglas Adams,** and other "name" authors took their first steps into computers, turning book titles into "interactive novels."

Steve Levy wrote about the early hackers.

- Steve Levy's **Hackers** told the story of the young men who devoted every waking hour to their obsession with computers, and founded the computer industry in the 50's, 60's, and 70's.
- **ABC** introduced **Skycam,** a computer-controlled camera that is suspended from cables and moves up to 25 mph. It's used to bring new excitement to football, auto racing, and rock concert coverage.
- The school computer at **Kennedy High** in Chicago claimed that student **Joseph Triggs** missed a full year of school. Triggs claims he was there all along.
- Heisman Trophy winner **Doug Flutie's** biggest problem wasn't picking a pro football team--it was picking an agent. No problem. Flutie's dad created a computer program to help Doug make the right decision.

Douglas Adams now a software author.

Doug Flutie got an agent by computer.

UPI/Bettmann Newsphotos

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UTING

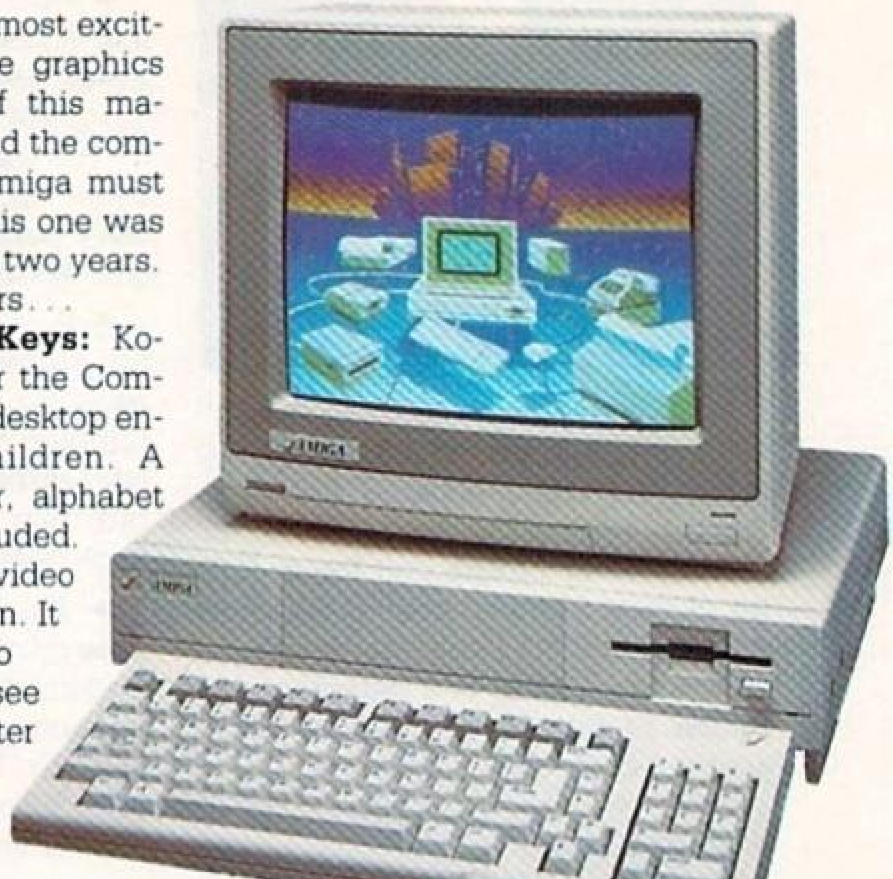
New Commodore Hardware

The year 1985 was a transitional year for Commodore Business Machines. The PET and the VIC 20 had been the first generation. The Commodore 64 was the second generation. The third generation was introduced this year.

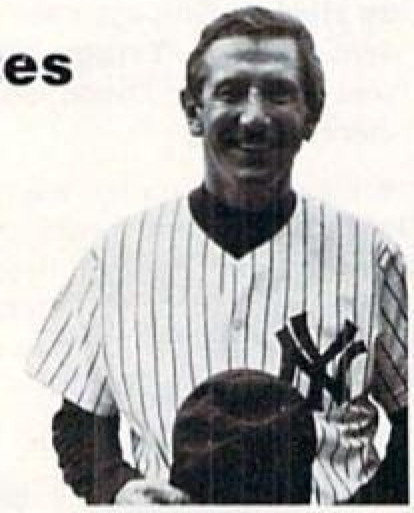
- **Commodore 128:** the natural sequel to the Commodore 64. The 128 is twice as powerful and fully compatible. Along with it came a new faster disk drive and a 1200-baud modem.
- **Amiga:** Perhaps the most exciting story of the year. The graphics and sound capabilities of this machine are light years beyond the computers we know today. Amiga must be seen to be believed. This one was in the works for more than two years.

From other manufacturers . . .

- **Muppet Learning Keys:** Koala's innovative plug-in for the Commodore 64 simulates the "desktop environment," but for children. A computerized ruler, eraser, alphabet and colored paints are included.
- **Computereyes:** A video digitizer from Digital Vision. It allows you to point a video camera at the world and see the image on your computer screen.

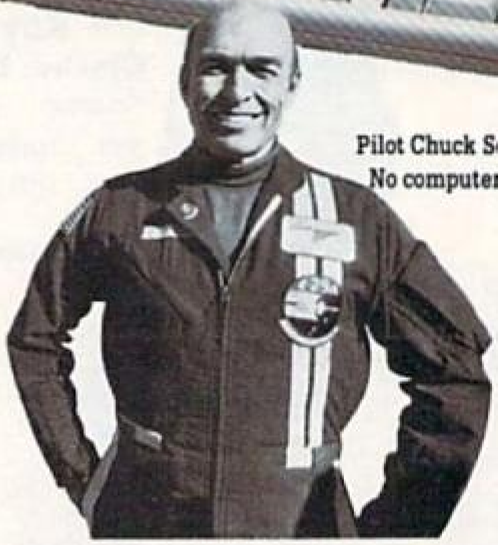


Quotes of the Year



UPI/Bettmann Newsphotos

"They know that computers represent potentially the most significant change in the delivery of education since the invention of printing."
The New York Times



Pilot Chuck Sewell:
No computer, no plane.

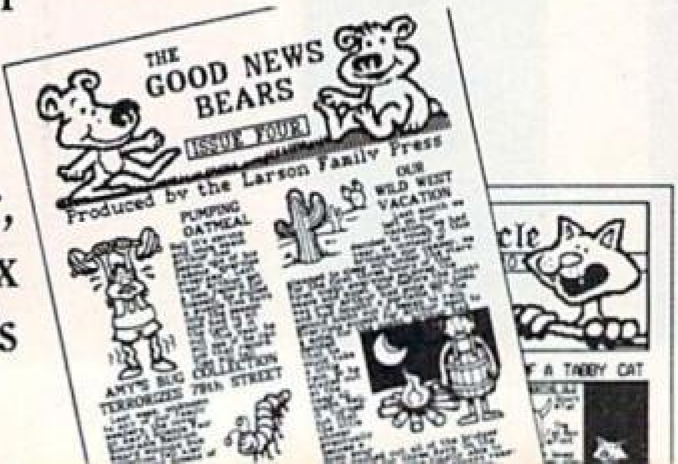
UPI/Bettmann Newsphotos

"I think the greatest change is the way ball clubs trade players. The people you deal with are more upright now, because the technology has improved. We have our computer, they have theirs."
Billy Martin,
New York Yankees
Manager

"The cat was really a computer problem."
Shelly Leigh Palmer,
creator of the Meow Mix
commercials

"You don't want to mow the baby."
Nolan Bushnell,
on robots that do the
vacuuming

"I got into television because I didn't like it, and I guess I got into computers for the same reason." Mister Rogers



THE GOOD NEWS BEARS
ISSUE FOUR
Produced by the Larson Family Press

"If I lose all the computers, the airplane self-destructs in two-tenths of a second."
Air Force test pilot
Chuck Sewell

New Commodore Software

In 1985, a startling discovery was made—computers can do more than process words, crunch numbers and play games. Who would have thought a computer could breakdance? They can do a million things, and here are a few of the new applications . . .

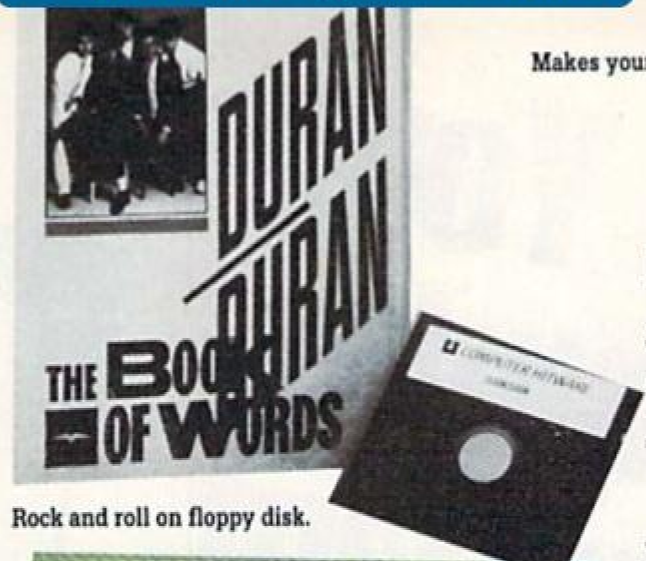
- **The Newsroom** (Springboard): Create your own slick newsletters by combining word processing, fancy borders, and 600 different graphics. You can even send your newsletter over phone lines.

- **Rock Video Software** (Passport, Sight & Sound): Digitized rock songs by Michael Jackson, The Police, Duran Duran and other rock stars are now on disk, and you can create your own animation to play along with the music.
- **The Print Shop** (Broderbund): Professional looking greeting cards can now be made at home. *The Print Shop* also contains unusual typefaces and decorative borders, and even colored paper and matching envelopes.
- Great new games: **Jet,** Sublogic's follow-up to the megahit **Flight Simulator II. Ballblazer** and **Rescue on Fractalus,** from Lucasfilm and Epyx.
- Licenses keep coming: **The Goonies, Dallas Quest, Spy vs. Spy, Ghostbusters, Indiana Jones and the Temple of Doom, Hitchhiker's Guide to the Galaxy.**
- And perhaps the weirdest program of the year is **Di's Baby,** from England's Bad Taste Software. In this one you play Prince Charles and you've got to dodge flying diapers while nannies chase you around to keep you from Lady Di.

Trends of the Year

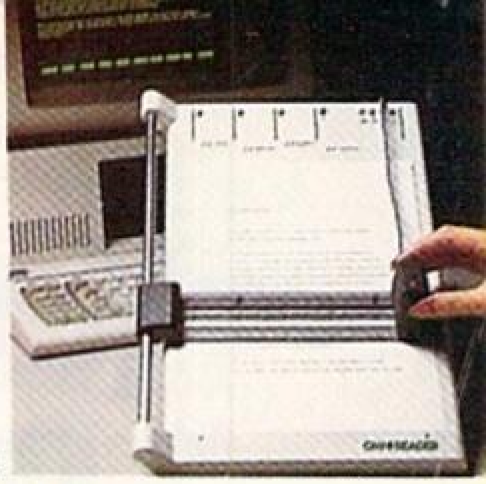
Sometimes it's hard to tell the difference between fads, short-term trends, and important developments that will influence the future of computing. Only history will decide, but here are some of the events that qualify in 1985.

- **"Artificial Intelligence"** had to be the buzzterm of the year. Most of the computer magazines devoted cover stories to the phenomenon although there were little or no products in the stores that even *claimed* to be artificially intelligent. We read about things like typing programs which will finish a word after you start it, but right now "AI" is just jargon.
- **Computer orphans:** The public makes the ultimate decision about which computers are good and which are not. Unfortunately, people who buy computers that are discontinued get stuck with them. This year 300,000 Adam owners and 250,000 PCjr owners joined the ranks of millions of computer orphans.
- **Computer commuters.** This year millions of people left their jobs—to work at home. When people work at a computer terminal from their homes, they can be more productive, save time and money because they don't have to get in their cars, and can care for their children while they work. On the other hand, some people feel lonely, isolated, and sit around eating bon bons and watching soap operas all day. Computer commuting isn't for everybody.



Rock and roll on floppy disk.

- **Telecommunications:** More and more people bought modems and discovered that one of the most exciting things you can do with a computer is to hook it up with other computers over phone lines. People tapped into electronic bulletin boards, information networks, and recreational networks. Brainworks released *Tele-Chess,* a program that lets two people play a game of chess even though they're thousands of miles apart.
- **Construction Sets:** The success of *Pinball Construction Set* inspired a library of free-form construction software, such as *Adventure Construction Set*, *Dream House*, *Mail Order Monsters*, *Racing Destruction Set*, and *Build-A-Book*.
- **Trivia Games:** If there's a national phenomenon, the software companies have learned to jump on it. Such was the case with the board game Trivial Pursuit, which spawned at least a dozen computer versions that are too trivial to list here. None were as much fun as Trivial Pursuit.
- **Operation Frog** (Scholastic): Do a simulation of a frog dissection on-screen. When you're done, put your frog back together and watch it dance. Try that with a real frog!



Omni-Reader:
Makes your computer literate.

New and Future Technology

If computing is still in its infancy, what does the future have to offer? The year 1985 gave us a peek at 1986 and beyond.

- **Information kiosks:** If you fly to San Francisco, check out the computerized information terminals that are scattered around the airport. They'll tell you the sights to see, which movies are playing that night, the best restaurants in town, and more. These things will be popping up everywhere soon.
- **Optical character recognition:** Oberon's new Omni-Reader is a peripheral that "reads" text the same way some supermarket cash registers "read" prices. Pretty soon we'll be able to lay a newspaper clipping down on a sheet of glass and see the text appear on our computer screens, ready for word processing.
- **Wireless modems:** Instead of sending data over phone lines, experts are starting to talk about sending data over FM radio sidebands. Pretty soon we'll be able to turn on the radio, hear a few beeps, and walk away with some new software.
- **Compact Disks:** Just as the compact disk is revolutionizing music, it will revolutionize computing. Unlike floppies, a compact disk is indestructible, and can store 170,000 pages of text. Put an encyclopedia on a disk! The potential is enormous.
- **Electronic Still Cameras:** Who needs film when you can put a chip in the back of a camera to record visual images? After the picture is taken you'll be able to store it on disk, save it, manipulate it with a graphics program, send it electronically, and make a printout.
- **Automobile Information** Guidance Systems: The electronic road map is coming. All the major car companies are experimenting with dashboard computers that will not only tell us when to turn left or right, but also tell us about all the restaurants in the next 50 miles.

Sound exciting? See you in 1986! ■

Keep Your Computer Equipment Alive and Well

BY TOM BENFORD

Caring properly for your electronic equipment will prolong its life and prevent frustrating breakdowns in mid-program.

Perhaps more than anything else, preventive maintenance will add years to your computer equipment. Many common ills of computer equipment can be stifled before they get a chance to start—by maintaining the equipment according to a regular regimen of inspection, cleaning and lubrication.

While computers, monitors, disk and tape drives, and printers all vary as to their specific maintenance requirements, there is some common ground that pertains to all of them. These common areas are: 1) they are all housed in plastic cases, 2) they all use electricity for power, 3) they're all highly susceptible to damage by heat or dust, and 4) static electricity can also be a threat to their well-being.

A Case in Point

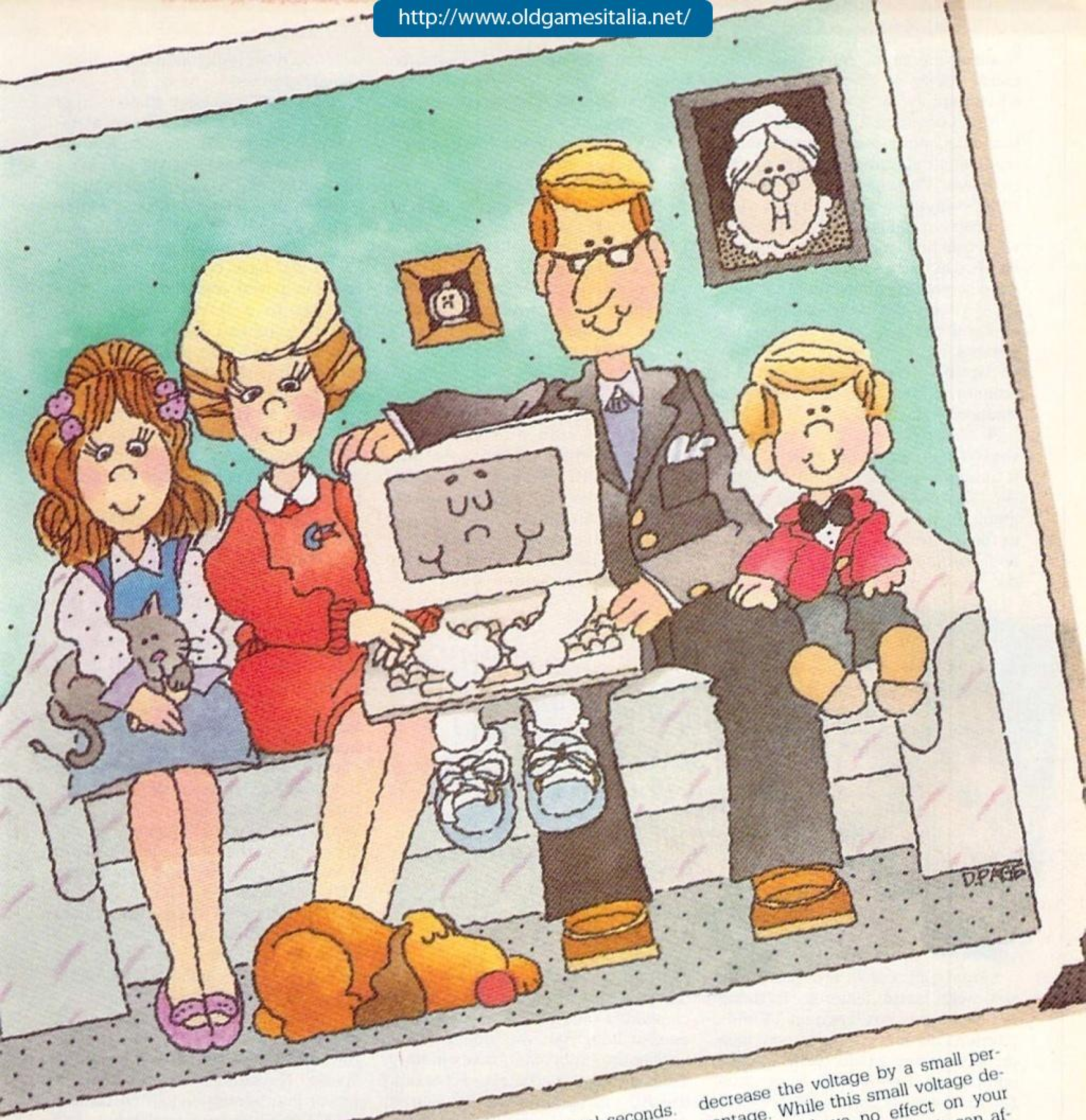
The plastic cases that house your computer, monitor, disk drive (or datasette), printer, joysticks and various other peripherals you're likely to have in your set-up are easy to maintain. Detergent removes tobacco-smoke residue that accumulates on your cases if you smoke around the equipment. Otherwise, a cloth dampened with warm water should do the trick for removing accumulations of dust, but make sure the cloth or sponge is wrung out thoroughly, since stray drops of water that find their way into the delicate innards of the device can wreak havoc.

Commercial spray-on cleaning products are equally effective for cleaning the plastic cases of your equipment, but these mixtures should never be sprayed directly onto the device. Instead, spray the cleaner onto your cloth or sponge, then wipe off the case. The same rule applies here: Make sure none of these mixtures enters the interior of the device you're cleaning.

Line Taming

Electrical spikes, surges, brownouts and power failures are the nemeses of your computer equipment. While varying in their characteristics, each of these conditions has the same ultimate effect: a disruption of your computing activities with a possibility of damaging your equipment.

A spike is a sudden jump in voltage that lasts for only an instant, and is totally unpredictable. Spikes can be caused at the power generating sta-



tion itself, along the lines to your home, or at the outlet that your equipment is plugged into. Whatever the cause, a spike can disrupt your computing and cause failure in your equipment.

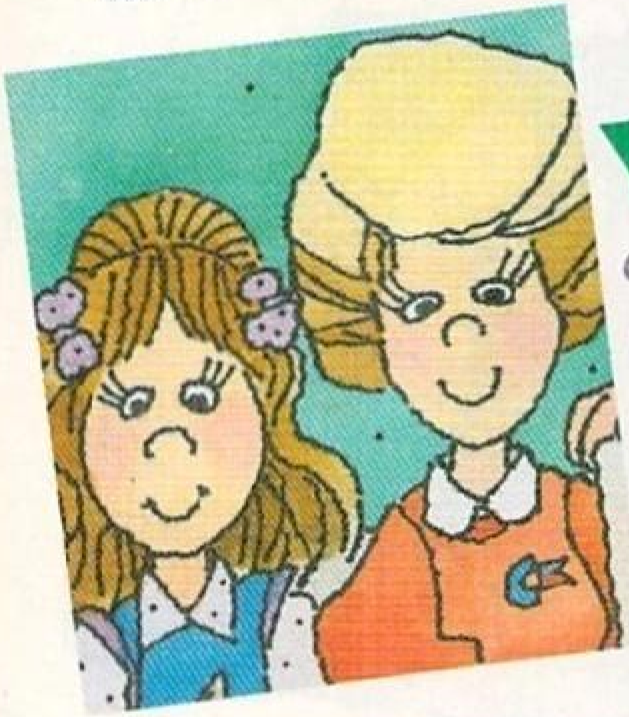
A surge is also an increase in the electrical voltage feeding your equipment, but it lasts considerably longer than a spike—often several seconds. Once again, the causes of surges may vary, but their detrimental effect on your equipment becomes evident in the form of damaged electrical components.

Brownouts frequently occur during the hot summer months when the use of air conditioners places heavy demands on public utility companies. To supply the increased need for electrical power, the utility company may decrease the voltage by a small percentage. While this small voltage decrease may have no effect on your other electrical appliances, it can affect your computer equipment. Brownouts often account for erratic disk drive and printer behavior, as well as garbled screen information and total loss of data in computer memory.

Power failures, or blackouts, are the total interruption of power. These may be caused by downed power lines, a malfunctioning transformer on the utility pole, or a blown household fuse or tripped circuit breaker. The result is the same, regardless of the cause: When it comes to computer equipment, no juice—no use.

A certain amount of latitude is built into most computer equipment to tolerate slight aberrations in the electrical power. The important word here is slight—anything more than a light "hiccup" in the power will be beyond what this built-in protection can handle. For higher tolerance levels, you'll need something to condition the electrical power before it reaches your equipment. To do this, you can use either a surge suppressor or an uninterruptible power supply (UPS) to monitor, correct and distribute electricity to your devices.

A surge suppressor accepts the voltage from your wall outlet, passes it through a filtering circuit and delivers "clean" voltage to your equipment. Any surges, spikes or "noise" in the electrical power are filtered out and absorbed by the surge suppressor.



You can protect your computer from the effects of spikes, surges and blackouts with a surge suppressor and/or an uninterruptible power supply.

Surge suppressors are often available with extra features, including RFI filtering to cut down on TV/radio interference, and offer practical, inexpensive protection for your valuable equipment. Prices vary from about $20 for the most basic model, well up to and over $100, depending on the quality and features of the unit. Some better models allow you to connect two, four or even six power cords into one unit, thereby effectively acting as an extension/junction box for all your equipment. Some models also offer a master power switch with illuminated pilot light. These extra features all add to the cost, but since a surge suppressor should last for many years, you might want to go the extra bucks for the extra goodies.

Among the better surge suppressors available are the SpikeMasters from Discwasher. Their FP-1000 model includes an RF filter section and 15-amp capabilities to four grounded outlets. Prices vary according to model, features and manufacturer, so shop around for the best buy. This is one item that you shouldn't skimp on.

The Power Controllers from Relax Technology are well-constructed units that offer independent power control switches for your device while providing surge protection as well. The models include the Power Control 1, 2, 3 and 4, with the main difference being the number of outlets and prices.

It should be noted that while surge suppressors will protect against surges or spikes from electrical storms and the like, they won't boost or supply power in low- or no-power situations. An uninterruptible power supply (UPS) is the way to go here.

A UPS is basically a combination of surge/spike suppressor and battery back-up power system all rolled into one. A series of built-in batteries are constantly charged by the incoming current from your wall outlet after it passes through some initial circuitry. This circuitry, in addition to changing the AC current into the DC current needed by the batteries, also filters out surges, spikes and the like. The batteries store DC electrical current, pass it on to inverter circuitry that changes it back into AC and powers your equipment.

The obvious advantages of using a UPS are that, even if power totally dies at the wall outlet, the batteries still have some stored in them, which can be used to get you through. The amount of time these batteries provide is usually only a few minutes, but that's enough for you to save whatever you're working on until the problem is corrected.

A UPS will also have some form of alarm built in to alert you to a no-power condition. Some units like the Cuesta Systems Datasaver provide a two-stage alarm to inform you of elapsed time. The Datasaver emits long beeps when power first fails and keeps it up for about three minutes. When you have only two minutes of back-up power remaining, the beep changes to a shorter, more frantic pattern to remind you of the urgency of storing your data now. The important thing is that power continues to your computer and peripherals uninterrupted so you can save your program or data, and under such emergency conditions, five minutes of backup power is more than enough to save your data.

Two power outlets are provided on the rear of the Datasaver, as well as terminals for connecting a direct 12-volt DC power source (such as a car battery). In such applications, the Datasaver performs the voltage conversion from 12 volts DC to 115 volts AC, and it can be used as a DC-to-AC transformer.

Thus, a UPS is the ultimate in electrical protection for your computer equipment. Ultimates seldom come cheaply, and you should be prepared to spend $300 or more for an uninterruptible power supply. Most folks would rather spend the money on other things, so they'll decide to go with a surge suppressor and buy something else with the change. To other people, insurance against loss of data is of tantamount importance; such a price tag is cheap insurance indeed against losing a customer's billing records because of a power failure.

Your need dictates what form of protection you choose, and that in turn affects how much you'll have to spend. Nevertheless, some form of power-line taming should be considered a *must* for your equipment. The bill to repair or replace a piece of equipment will be far greater than the cost of a surge suppressor to begin with.

Telephone lines are just as susceptible to spikes, surges and other fluctuations as power lines. When you are telecomputing via modem, such disturbances can cause loss of data, abrupt terminations of your telecomputing connection and other such phone/modem/computer headaches. The VPI 145 Telecommunications

Line Protector is, in effect, a surge suppressor for the computer's modem connection, both in design and function. The VPI 145 plugs into the phone jack. The modem cable, in turn, plugs into the VPI 145. Acting as a go-between device, the VPI 145 intercepts transient voltage spikes, phone line "noise" and other undesirable elements that serve to corrupt data transmission signals. If you do a reasonable amount of telecommunicating, this is a piece of preventive equipment you'd do well to outfit your modem with.

Cool It

Once again, your computer equipment is engineered to perform satisfactorily over a broad span of operating conditions. In general, this span pretty much parallels the span of human comfort—either too cold or too hot is a no-no, but heat in particular is a major cause of equipment failure. Even with today's solid-state electronic components a considerable amount of heat is generated and this can cause premature failure of delicate components. The simplest way of preventing heat-related equipment failures is to observe some simple operating rules:

1. *Avoid operating your equipment in environments where excessive heat will be present.* Excessive heat may be (for all practical purposes) 80 degrees Fahrenheit or higher. Particular things to watch out for are heating ducts or vents, close proximity to an electric or kerosene heater, or direct sunlight. Regardless of what the heat source is, too much heat will cause equipment problems.

2. *Make sure adequate ventilation is available to cool the equipment.* Be sure to check the vents of the plastic cabinets which house your equipment: All the ventilation in the world won't help if these vents are clogged. Make sure there is nothing to restrict air flow through these vents so your equipment can "breathe." Things to watch for in particular are dust-clogged vents, and papers, manuals or other items obstructing air circulation to the vents.

Disk drives can be susceptible to heat-related failures, and compact fans provide a remedy. The Uni-Kool C-100 disk drive cooler is a compact fan that attaches to the top rear ventilation ports of the 1541 to keep it running cool. The Uni-Kool has a replaceable filter for cleaning the air entering the drive, and the filter may be washed out and reused if desired.

Static electricity in a delicate electronic component can have the effect of a stick of dynamite going off.

CarboTech Incoporated also markets a fan for either one or two 1541's called the Cool Stack. It's an attractive unit constructed of solid oak with a nice finish that will accommodate either a one- or two-drive configuration. A replaceable, washable filter kit is supplied with the fan to cleanse the air before it enters the drive(s). The Cool Stack also features a convenient power switch built into the power cable for turning the unit on or off without unplugging it.

Both of these fans are very quiet in operation, provide high-volume air circulation into the drive vents, and do a good job of lowering the temperature of the 1541's components. If you keep your drive on for prolonged periods of time, a fan should be considered seriously as good disk drive insurance.

Static Electricity

If you've ever walked across a nylon-pile carpet and received a small shock when you touched a doorknob or other metal object, you've experienced the effects of static electricity firsthand. While such a shock may range from annoying to slightly painful for humans, the effect of it on a delicate electronic component may more closely resemble a stick of dynamite going off.

Most computer equipment is shielded from such transient static electricity discharges, but it never hurts to be safe. Anti-static mats are available from MicroComputer Accessories, Inc. and other manufacturers and are quite useful in protecting your equipment from such unexpected jolts. These mats prevent static charges from being built up by the user and transmitted to the equipment. They're particularly useful when you compute in a carpeted room.

While not a major problem for equipment, static electricity causes damage more frequently that you may realize, especially to floppy disks. A static jolt reaching the read/write heads can result in garbled data on the screen, at the least, and deleted data from the disk surface at the worst. An ounce of prevention in the static electricity department is indeed a worthwhile consideration.

Other Preventive Measures

Preventing problems and accidents before they occur is far better—and easier—than trying to rectify them in the aftermath. By removing potentially "hostile" items and/or conditions first, you'll be saving yourself a multitude of hassles later on. Here are a few particularly notorious culprits to be on the look-out for.

Magnetic Fields: Magnetism is the force that arranges the little bits of metal oxide on your disk surfaces into a coherent form that the computer can utilize. Magnetism can also be present in many electronic devices, with or without your knowing it—but the oxide coating of your disks will know it if it gets too close.

Televisions, electric fans, stereos (particularly stereo speakers), and other seemingly innocuous devices all either contain magnets or generate magnetic fields, and magnetism in any form is not healthy for stored data on disks or cassettes.

The easiest way of preventing data loss due to stray magnetism is to remove the offending objects from the range of your disks—18 inches is usually sufficient. It's also a wise idea to get into the "full consciousness" habit when handling your disks (or other equipment, for that matter). All this involves is reminding yourself that data is contained on these disks, and magnetism and other hostile forces can ruin it. By being mindful of what you're handling, you're less likely to have an accident with it.

Liquid: No matter what it is—soda, coffee, water, nail polish—if it can be spilled, keep it away from your equipment! Dumped cans of soda have claimed more keyboards, disk drives and other pieces of equipment than anything else. Sugar, often contained in soft drinks, is the real source of the problem, since it hardens and dries to a lacquer-like surface. This can cause keys to stick and drive motors to freeze up, impede the movement of the read/write head, mess up printer mechanisms, and in general cause a ton of problems. If your computer remains off-limits to anyone drinking anything, you'll save yourself a lot of grief.

In the unfortunate event that something does spill on your equipment, you may be able to prevent this tragedy from turning into a total loss by following these emergency steps:

1. *Turn off the equipment* and disconnect it immediately from the power source.
2. *Try to sponge off as much liquid as possible as soon as possible.* Papertowels or bathroom tissue prove to be particularly "thirsty" for soaking up spills. Cotton-tipped swabs are also useful for reaching into crevices to soak up stray drops of liquid, particularly on keyboard spills.
3. *Let the equipment dry out thoroughly* before attempting to re-connect and test it. For a light spill, 24 to 48 hours should be sufficient drying time; for a major deluge, a week or more may be required. In any case, hope for the best.

Plain drinking water is the least harmful liquid since it contains the fewest contaminants. In accidents involving plain water, the equipment often functions perfectly after sponging away the excess and allowing a sufficient drying-out period.

Salt water is quite a different story, though. The salt is corrosive to copper and other electrically-conductive surfaces, and just a small amount of it can ruin the delicate circuitry of your equipment. Even damp salt sea air should be avoided, since prolonged exposure to it can also cause problems in your equipment.

Check the Oil

As a general rule, most computer equipment will require little maintenance other than cleaning. Occasionally, however, lubrication may be called for as a part of the maintenance regime. I wish to stress that oiling or lubricating should not be done unless specifically called for in the owner's manual. Sealed bearings that never require lubrication are frequently used in modern computer devices, and trying to lubricate these bearings will cause problems rather than alleviate them. If your owner's manual doesn't say anything about lubrication in the maintenance section, assume that the device will need no further attention in this department.

Printers are usually the only devices that may conceivably need some lubrication, and this will be noted in the owner's manual. Be sure to follow the manufacturer's recommendations regarding the type of lubricant and the proper amount. Too much is as bad as (or worse than) not enough. If you have any doubts as to the lubrication needs of your printer, a phone call to the manufacturer's customer service department should set you straight.

Seemingly innocuous devices like televisions and electric fans can wipe out the magnetically stored information on a disk.

Dealing with Dust

Airborne particles are the biggest contaminants of your computer equipment and, consequently, demand the lion's share of attention. These particles may consist of common household dust, tobacco smoke, pollen, pet hair and such. Keeping your equipment relatively free of these contaminants will add greatly to both the performance and life of your gear.

To help prevent particle invasions, it's a good idea to use dust covers for your equipment. The available styles range from light see-through plastic covers to heavy-duty Naugahyde covers with prices in the $7 through $20 range depending on the material and manufacturer. Some covers are made of anti-static vinyl which help protect the equipment from static electricity jolts.

For the more economically minded, an old pillow case can be modified to serve as a dandy (and cheap) dust cover. A bed sheet can also be utilized as a "drop cloth" to cover your entire equipment ensemble when you're not using it.

Don't be afraid to use your imagination on your quest for equipment dust covers. I know folks who use plastic trash bags to protect their gear. While not likely to win any awards for aesthetics, the bags serve their purpose.

Disks are subject to dust contamination also, and therefore should be kept in some form of protective case. There are several disk holders and disk storage cases available commercially which all work well. While they're often very convenient to use and have a nice appearance, there are cheaper ways of protecting your disks if you know where to look.

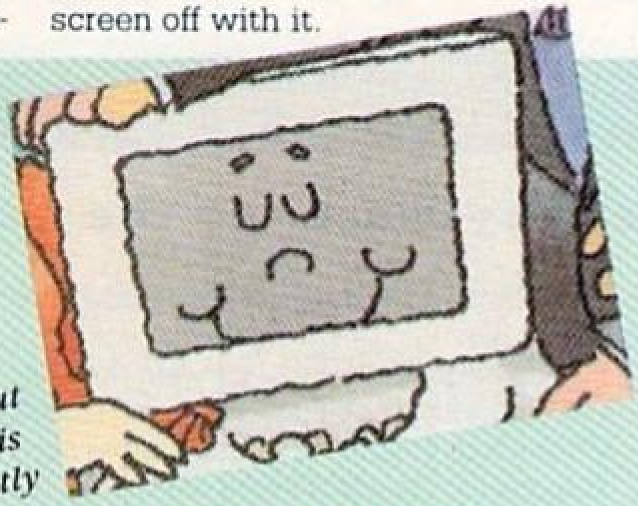
The kitchen might be a good spot to start. Plastic containers with snap-on lids make excellent disk storage boxes. At the very least, keep your disks in their protective paper envelopes when not in use—some dust protection is better than none at all.

To further aid you in your war against dust, the Mini-Vac from The Pine Cone is a miniature, battery-powered vacuum cleaner that is very useful for removing dust and debris from your equipment. It comes with two interchangeable wands and two fine-bristle brushes for getting at hard-to-reach areas. A cloth vacuum bag collects these contaminants, and the whole unit weighs less than half a pound.

Photographers have used "canned air" for years to blow away dust from their camera lenses. In truth, these products contain dichloridofluoromethane or other such inert, nonflammable gases, not air. Falcon Product's Dust-Off is probably the best-known of these "canned air" products, and it is an effective tool for cleaning computer equipment, as well. A reusable nozzle-trigger assembly mounts to the top of the can and several extension tips are available for those inaccessible areas. Often a sharp blast of air does wonders to dislodge small bits of debris that invariably find their way into the workings of printers and other devices, and these nozzles are great for directing the blast where it will do the most good. Remember that while such blasts will indeed disperse the dust, it's going to settle down again somewhere else, so try to collect and remove it with a brush or vacuum.

Monitor and television screens, because of the electro-static fields generated by electron and photon activity within the phosphor surface of the CRT, attract dust and dirt literally like a magnet. Anti-static screen cleaners are available from Falcon Products and other manufacturers, which will reduce the dust-attracting tendency of the screen. If you use one of these products, remember not to spray it directly onto the screen. Spray your cloth with the cleaner and wipe the screen off with it.

Keep Your Computer Equipment Alive Manufacturers/ Distributors



If you'd like more information about any of the products mentioned in this article, contact the companies directly at these addresses and phone numbers.

Carbotech Incorporated
P.O. Box 652
Snellville, GA 30278
(404) 979-6124
Cool Stack single/double disk drive fan, other accessories

Cuesta Systems, Inc.
3440 Roberto Court
San Luis Obispo, CA 93401
(805) 541-4160
Datasaver uninterruptable power supply-/battery power backup system, other products

Discwasher
1407 North Providence Road
P.O. Box 6021
Columbia, MO 65205
(314) 449-0941
SpikeMaster surge suppressors, Clean Runner disk drive cleaner, other products

Falcon Safety Products, Inc.
1065 Bristol Road
Mountainside, NJ 07092
(201) 233-5000
Dust-off, Halon® 1211 fire extinguisher, anti-static spray, other computer care products

Microcomputer Accessories, Inc.
5721 Buckingham Parkway
Culver City, CA 90230
(213) 641-1800
Anti-static mats, disk storage boxes, other accessories

Micro-W Distributing, Inc.
1342B Route 23
Butler, NJ 07405
(201) 838-9027
Mr. Tester Diagnostic Disk, other products

NEBS Computer Forms
12 South Street
Townsend, MA 01469
(617) 597-8715
Anti-static vinyl dustcovers, other products

The Pine Cone
Blake Building
P.O. Box 1378
Gilroy, CA 95021
(408) 842-7597, 842-4797
Mini-Vac battery-powered miniature vacuum cleaner, other products

Relax Technology
3101 Whipple Road #25
Union City, CA 94587
(415) 471-6112
Power Controller Series surge suppressor/line filter/power control units, other products

Uni-Kool
909 Williamson Loop
Grants Pass, OR 97526
(503) 476-1660
Uni-Kool disk drive fan

Video Peripherals, Inc.
1667 West Ninth Street
Long Beach, CA 90813
(213) 437-4883
VPI-145 Telecommunications Line Surge Suppressor, other products

Disk drives also offer a haven for dust particles. Dust can enter the drive through the ventilation holes in the case, through the disk door and even on the surface of the disk itself. It's widely believed that keeping the drive door closed even when not in use will help keep the dust down to a minimum. In truth, it won't, but if it makes you feel better, do it. It's more important to keep the vent slots open and clean, since these are the main entry points for contaminants.

Be aware of the fact that dust is still going to get into your equipment regardless of your efforts to squelch it. Since the drive's read/write head is the delicate surface that comes into actual contact with your disk, keeping it clean is of paramount importance in preventing data storage and retrieval problems.

Although there are several disk drive cleaners on the market, most of them rely on a liquid cleaning system—remember what I said earlier about liquids and computer equipment. If you do decide to go the wet route, follow the instructions implicitly and keep the liquids out of harm's way when you're through with them. My personal preference is for non-liquid cleaners, and there are several available at computer stores.

The Clean Runner interactive drive cleaner from Discwasher is an excellent "dry" system for cleaning your drive heads. The Clean Runner is a diskette with a soft, non-abrasive cleaning surface. What makes it totally unique is that the disk also contains software to direct the drive's heads to a different track for each of 20 separate cleaning operations. Discwasher recommends using it once every other week for normal conditions and more frequently for heavier commercial applications. Since the whole cleaning operation takes only about 30 seconds to complete, keeping your drive heads clean this way is a truly minor chore.

Other Maintenance Methods

Diagnostic software is abundant for the 1541 disk drive and other peripherals. While such programs are indeed useful for diagnosing a problem with your drive, printer or other equipment, they are no substitute for a qualified, trained technician and no attempt should be made by the user

Continued on page 116

Melodian will teach you to play, compose, record and print music in just one evening!!

The Melodian Musical Keyboard for the Commodore 64 and 128.

A True Breakthrough In Music Education

At last, a program that makes it not only easy but fun to learn music. The Melodian keyboard and software were designed by Harry Mendell who designs custom synthesizer electronics and software for professional musicians such as **Stevie Wonder** and Eric Himy, an award winning concert pianist. The Melodian boasts many of the professional features found only on more expensive equipment. These features include multitrack recording, the ability to create custom instrument sounds and most importantly, ease of use.

Start your lesson with **RhythmMaster** Software. With its built-in metronome, RhythmMaster will display the treble and bass musical staffs and a picture of a piano keyboard. RhythmMaster will then play a measure of music and you must try to play the same measure back on the Melodian keyboard. You're not familiar with the keyboard or can't read music? No problem. RhythmMaster displays the notes you are to play on the musical staff and on the keyboard pictured on the monitor. If you strike the wrong key the note on the musical staff turns red and shows you which key you played wrong, making it ever so easy to correct what you played.

If you should hold a key too long a turtle runs across the screen. Inversely if you should release a key too quickly a rabbit scurries by. If you don't play it correctly RhythmMaster knows it and repeats the measure for you to play.

Sounds easy doesn't it? Now add the fun. You start with six composers (Bach, Handel, Mozart, Beethoven, Schubert and Wagner). The object is to attain the next level of difficulty without losing a composer. You lose a composer each time you accumulate ten mistakes. There are twelve levels of difficulty attainable ranging from tyro to maestro.

ConcertMaster teaches you how to play 35 pre-recorded songs from Bach to Rock. With ConcertMaster you can analyze music note by note, instrument by instrument and learn how a music composition is put together. Then you can compose your own music and record it right onto your floppy disks.

There are nineteen different instrument sounds to choose from in over a seven octave range giving you a wide choice of instruments to suit your musical taste and expression. You can also create your own instrument sounds.

ScoreMaster enables you to print out your music in standard music notation for other musicians to play, or for yourself.

AHOY! Magazine Says . . .

Peggy Herrington of AHOY! said "The system is so easy to use that I didn't need the documation". "It's fun, challenging, and educational, and for playability and ease of use it is nothing short of spectacular."

New York Times Says . . .

Erik Sandberg-Diment of the New York Times states "really useful and instructive item ... Tanya, our 10 year old beginner quickly caught the spirit of matching the dance of her fingers to the measured metronome." "One piece of educational software that, unlike most of its kinfolk, actually delivers. These software-hardware combinations offer a lot of entertainment to the Commodore owner."

RUN Magazine Says . . .

Tom Benford of RUN notes "Whenever a selection of products of the same genre is available, one among the bunch rises head and shoulders above the rest. Such is the case with Melodian ConcertMaster keyboard and software. The combined features of RhythmMaster and ConcertMaster give you a complete music tutorial."

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By selling directly to you, we are able to give you the Melodian Keyboard and Software at far lower prices than ever offered before. You take no risk. **If the Melodian keyboard or any of the programs don't please you, for any reason whatsoever, send it back within 60 days for a full refund!**

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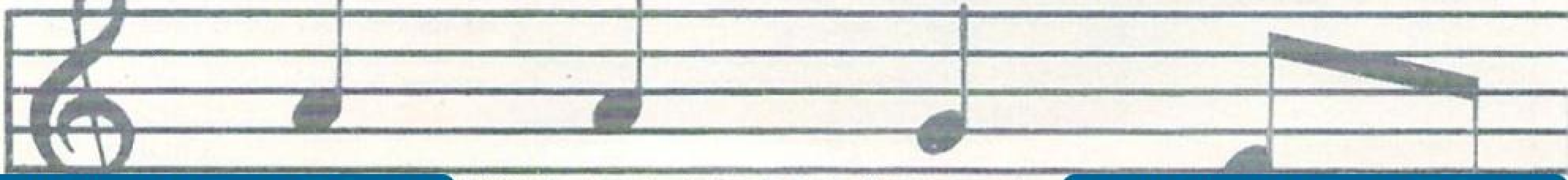

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Melodian Musical Keyboard $99.95

Keyboard
40 Keys (A-C) in professional gauge spring loaded to give the feel and response of a real keyboard instrument. Polyphonic.

Registers (with ConcertMaster)
Organ, Trumpet, Flute, Clarinet, Piano, Harpsicord, Violin, Cello, Bass, Banjo, Mandolin, Calliope, Concertino, Bagpipe, Synthesizer 1, Synthesizer 2, Clavier 1, Clavier 2, which can be played over a 7 octave range. Programmable sounds as well.

Recording (with ConcertMaster)
Three track sequencer (recorder) with overdubbing and multitimbral (different instrument sounds at the same time) effects.

Interface
Built in interface for Commodore 64, Commodore 128, plugs right in to joystick port no. 2 and user port.

Power Supply
Powered direct by the computer, no batteries and cords required.

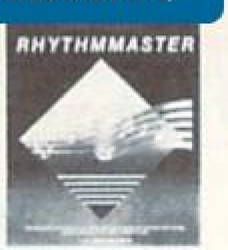
Finish
Table Model in white high-impact material, with carrying handle, protective key cover, and built in music stand. Size 29 -1/8 x 9-9/16 x 3-11/16, weighs 9 pounds.

Melodian ScoreMaster
sm-01 $29.95

With the ScoreMaster program your music can be printed out in music notation, which other musicians can read and play. Any music recorded with the ConcertMaster program can be printed by ScoreMaster.

ScoreMaster Requires:
- Commodore 64 or Commodore 128 with disk drive and printer compatible with the Commodore graphics mode such as the Commodore MPS 803, 1515, and 1525.
- Melodian ConcertMaster program.

RhythmMaster Software rm-01
$29.95



RhythmMaster teaches a beginner how to read music and play it correctly and in rhythm on the musical keyboard.

RhythmMaster will have you reading and playing musical notes in minutes with fun and excitement.

RhythmMaster Features:
- Trumpet, organ, violin, and synthesizer instrument sounds.
- Built in metronome.
- Pause/Play control.
- Set-up menu for customizing RhythmMaster.

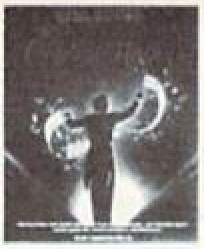
RhythmMaster Teaches:
- How to read notes on the treble and bass musical staffs.
- The names of the notes.
- Where the notes are on the keyboard.
- How to play whole notes, half notes, quarter notes, eighth notes and sixteenth notes in combinations, in both 3/4 and 4/4 time.
- How to play in different tempos.

RhythmMaster Requires:
- Commodore 64 or Commodore 128 with disk drive.
- Melodian Musical Keyboard kb-01 is required to study the reading and playing of musical notes. However, RhythmMaster can be used without the Melodian Musical Keyboard to study rhythm, by playing the notes on the computer keyboard.

Programmer's Tool Kit
pt-01 $29.95

Contains programs, and BASIC source listings for reading the Melodian Musical Keyboard, and for reading and creating music files for Melodian ConcertMaster.

ConcertMaster Software cm-01
$29.95



ConcertMaster teaches how a composition is put together, note by note, instrument by instrument. You learn to play 35 pre-recorded songs from Bach to Rock. Then you can compose your own songs and record them right onto your floppy disk.

ConcertMaster Teaches:
- Scales
- Bass lines
- Familiar Beginner Songs such as "Jingle Bells"
- Easy classical songs such as "Bach Minuet" and Ravel's "Bolero"
- Advanced classics like "A Midsummer's Night Dream" by Mendelssohn
- Popular hits such as "Thriller"

Instruments Sounds
Organ, Trumpet, Flute, Clarinet, Piano, Harpsicord, Violin, Cello, Bass, Banjo, Mandolin, Calliope, Concertina, Bagpipe, Synthesizer 1, Synthesizer 2, Clavier 1, Clavier 2, which can be played over a 7 octave range. Programmable sounds as well.

Recording Functions:
Three track sequencer (recorder) with overdubbing and multitimbral (different instrument sounds at the same time) effects.
Each track can be set to one of seven different functions:
- **Monitor:** Lets you use a track to play music live, without recording it.
- **Record:** Records a track as you play.
- **Playback:** Lets you hear whatever has been recorded or loaded into the track. You may playback one track while recording another to build layers of instruments.
- **Mute:** Turns a track off. This is useful when you want to listen to or record one or two tracks at a time.
- **Save:** Stores a track to the disk.
- **Load:** Loads a track from the disk.
- **Protect:** Write protects a track.

Create New Instrument Sounds
- Choose from pulse, sawtooth, triangle and noise sound sources.
- Control the sound envelope with attack, decay, sustain, and release times.
- Ring Modulation and Syncronization effects.
- Set Low pass, band pass, and high pass filter frequencies.

ConcertMaster Requires:
- Commodore 64 or Commodore 128 with disk drive.
- Melodian Musical Keyboard kb-01 is required to study the reading and playing of musical notes. However, ConcertMaster can be used without the Melodian Musical Keyboard to playback the recorded musical examlpes, record music played on the computer keyboard, and to create new instrument sounds.

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BY ISAAC MALITZ, Ph.D.

A Very Simple Computer

What is a computer, really? What are the fundamental characteristics which make up a computer? If you reduce a computer to its bare essentials, what does it consist of?

One way to explore these questions is to study examples of very simple computers. By examining such minimal computers, we can learn a lot about the essential characteristics which must be present in all computers, big and small. Let's look at an example of a minimal computer we shall call MINIMALC1. MINIMALC1 has a command vocabulary (instruction set) of only three commands, and only five memory locations. Yet it qualifies as a true computer; if you program it cleverly enough, it can achieve all of the complexity of a big computer. Because of its utter simplicity, MINIMALC1 reveals many of the fundamental characteristics of computers with elegance and clarity. For this reason, MINIMALC1 and other minimal computers are of great interest to the computer scientist.

In this article, we are going to describe exactly how MINIMALC1 works, and we will try our hand at programming it. Finally, we will describe how you can simulate MINIMALC1 on your Commodore computer.

Description of MINIMALC1

MINIMALC1 is a very simple computer which, as I said before, has a command vocabulary of only three commands and only five storage locations. The five storage locations are known as registers. We will refer to the five registers as R1, R2, R3, R4, and R5. Each register may hold zero or any positive integer. There is no limit on how large an integer may be stored in a register. Negative numbers are not allowed.

The command vocabulary (instruction set) for MINIMALC1 is very limited, having only three commands. Despite this meager vocabulary, it turns out that MINIMALC1 can be programmed to attain the complexity of a big computer. A MINIMALC1 program is a series of program lines, each line consisting of one command. Each line has a line number: 1, 2, 3, and so on.

Despite its limited vocabulary and storage space, MINIMALC1 can be programmed to attain the complexity of a big computer.

The command vocabulary for MINIMALC1 consists of the following three commands:

A The A command tells the computer to add one to one of the registers. The command consists of an A, followed by a number between one and five. That number tells the computer which register to add one to. For instance, A4 tells the computer to add one to register four.

S The S command examines the value in a certain register, and then performs one or two actions, depending on whether the value is zero or greater than zero. If the value is greater than zero, the computer will subtract one from the register. If the value is zero, the computer will leave the register alone, and go to another line of the program, specified in the S command. The S command consists of an S, followed by a number, followed by a G, followed by another number. The first number tells the computer which register to subtract one from. The second number tells the computer what program line to go to, in case the register in question contained the value zero. For instance, S2G9 tells the computer: "If the value of register two is not zero, then subtract one from it. Otherwise, leave the register alone, and go to line 9 of the program."

H The H command tells the computer to halt. The H command is equivalent to the END command in BASIC. The H command always consists of just an H by itself.

That completes an explanation of how MINIMALC1 works. In the next section, we will illustrate an actual program for MINIMALC1.

A Program to Perform Addition

The following program will compute the sum of any two numbers. When the program begins, it assumes that the numbers to be added are in registers R1 and R2. It also assumes that the values in the other registers are zero. When the program has finished, the answer will be in register R2. So for instance, if the initial value of R1 is three, and the initial value of R2 is two, then when the program is finished, the value in R2 will be five.

Here is the program:

```
1  S1G4
2  A2
3  S3G1
4  H
```

The program is basically a simple loop: Each time through the loop, the computer subtracts one from register R1, and adds one to register R2. This process is repeated until the value of R1 is reduced to zero. At that point, the value of R2 will be the sum of the original values of R1 and R2.

If you were to translate the program into plain English, it would read something like this:

Line 1: If R1 is greater than zero, then subtract one from it. Or, if R1 is zero, then go to line 4.
Line 2: Add one to R2.
Line 3: Go to line 1.
Line 4: Halt.

A more literal translation for Line 3 would be: "If R3 is greater than zero, then subtract one from it. Or, if R3 is zero, then go to line 1." However, when the program is running, the value in R3 is always zero. So the command in line 3 is really equivalent to saying "Go to line 1."

To understand thoroughly how the program works, let's go through an example. In Example 1, we trace how the program would go about computing the sum of the numbers 3 and 2.

For the program to carry out this

Commodore 64

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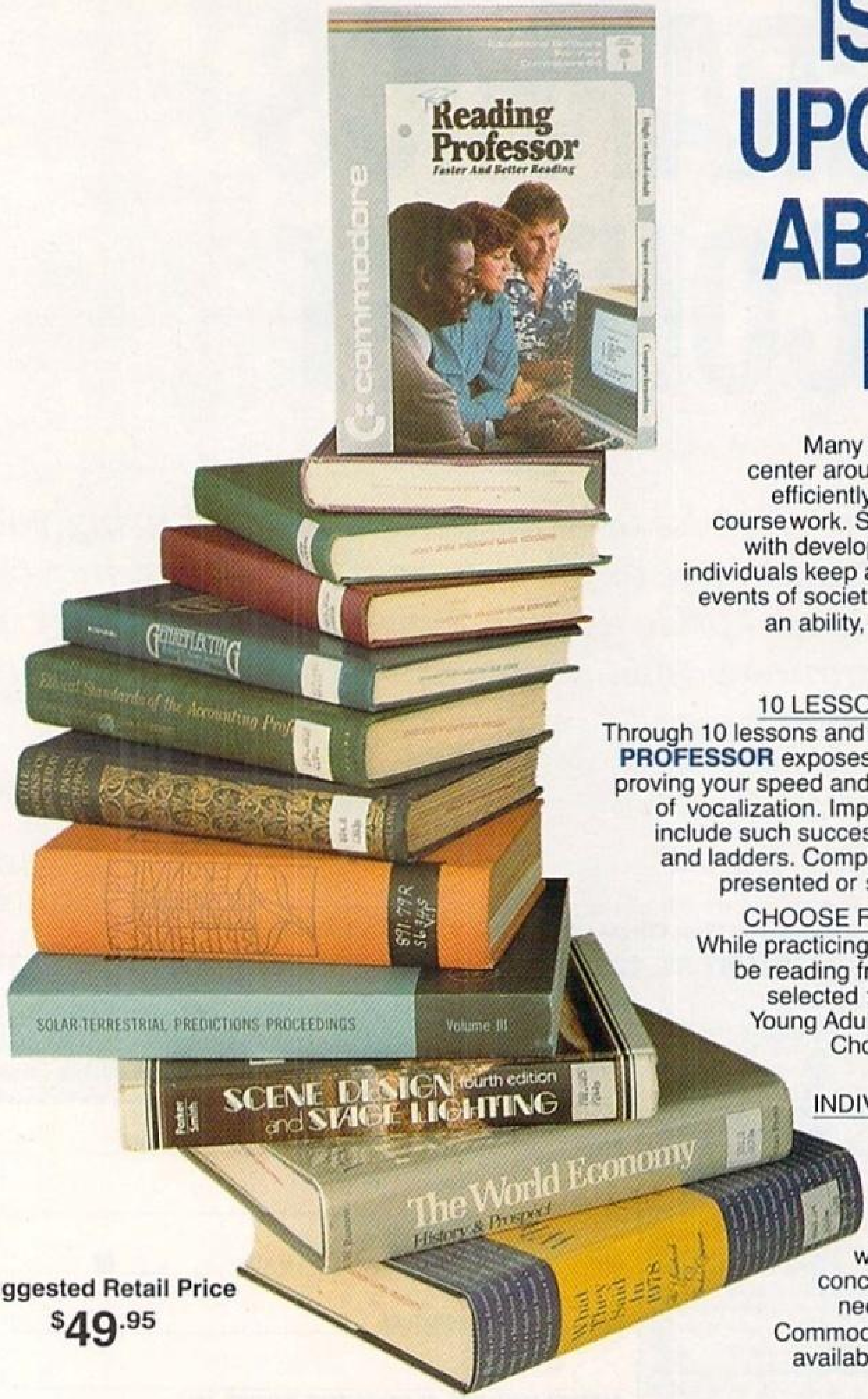
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task, the initial values in the registers must be as follows:

R1	R2	R3	R4	R5
3	2	0	0	0

When the program is executed, Example 1 shows what would happen (the information in the two right-hand columns show what line in the program is next executed).

As you follow the trace, you can see how the value in R1 is gradually decreased and the value of R2 is gradually increased. Also, if you look at the two right-hand columns of the chart, you can see how the program loops (it loops through lines 1, 2, and 3 several times, then branches to line 4, which halts the program). At the end of the program, the value in R2 is the sum of the original values in R1 and R2.

Simulating a MINIMALC1 in BASIC

The following program in BASIC will precisely simulate the behavior of the MINIMALC1 computer. In order to simulate the MINIMALC1, we need to represent the five registers in MINIMALC1, and we need to represent MINIMALC1's program. In our simulation program, we will represent the registers as five variables: R(1), R(2), R(3), R(4), and R(5). We will represent MINIMALC's own program as a series of data statements in our simulation program.

In the listing which follows, we have set the variables R(1) through R(5) and the data statements to correspond to the addition example presented in the previous section.

```
        MINIMALC1 Simulator
1       REM MINIMALC1
        SIMULATOR
100     R(1)=3:R(2)=2
200     L=1
300     RESTORE
310     FOR I=1 TO L:READ
        C$:NEXT I
320     PRINT R(1); R(2); R(3); R(4);
        R(5), L;C$
400     C1$=MID$(C$,1,1)
410     RN=VAL(MID$(C$,2,1))
500     IF C1$="A" THEN 600
510     IF C1$="S" THEN 700
520     IF C1$="H" THEN END
600     R(RN) = R(RN) + 1
610     L=L+1:GOTO 300
700     IF R(RN) = 0 THEN 750
710     R(RN) = R(RN) - 1
720     L=L+1:GOTO 300
750     L=VAL(MID$(C$,4)):
        GOTO 300
1001    DATA "S1G4"
1002    DATA "A2"
1003    DATA "S3G1"
1004    DATA "H"
```

When you run this program, a display like this will appear on your screen:

```
3  2  0  0  0    1    S1G4
2  2  0  0  0    2    A2
2  3  0  0  0    3    S3G1
2  3  0  0  0    1    S1G4
1  3  0  0  0    2    A2
1  4  0  0  0    3    S3G1
1  4  0  0  0    1    S1G4
0  4  0  0  0    2    A2
0  5  0  0  0    3    S3G1
0  5  0  0  0    1    S1G4
0  5  0  0  0    4    H
```

This is a trace of the addition program as it is executed by MINIMALC1. This is similar to the trace shown in the previous section of this article.

If you want to watch this simulator perform another addition calculation, just change the values of R(1) and R(2) in line 100 of the simulator program. For instance, if you want to watch the simulator program add together the numbers 73 and 943, change line 100 to look like this:

```
100 R(1)=73:R(2)=943
```

Example 1.

R1	*R2*	*R3*	*R4*	*R5*	*Line Number Executed Next*	*Command*
3	2	0	0	0	1	S1G4
2	2	0	0	0	2	A2
2	3	0	0	0	3	S3G1
2	3	0	0	0	1	S1G4
1	3	0	0	0	2	A2
1	4	0	0	0	3	S3G1
1	4	0	0	0	1	S1G4
0	4	0	0	0	2	A2
0	5	0	0	0	3	S3G1
0	5	0	0	0	1	S1G4
0	5	0	0	0	4	H

How the MINIMALC1 Simulator Works

First, let's explain the meanings of a few key variables in the simulator program:

> The variables R(1), R(2), R(3), R(4), and R(5) hold the values in the five registers.
>
> The variable L is the line counter. It tracks what line number MINIMALC1 is currently on in its program.
>
> The variable C$ holds the command which is currently being executed by MINIMALC1.

Now, let's examine the simulator program section by section. Lines 100-200 set the initial values for registers, and MINIMALC1's line counter at one (L is the line counter).

Lines 300-310 find the next command to be executed by MINIMALC1, and store that command in the variable C$. MINIMALC1's program is stored in a series of data statements at the end of our simulator program, in lines 1001-1004. (Compare this to the addition program presented earlier.) Our simulator program reads through these data statements, until it finds the Lth statement. This corresponds to Line L in MINIMALC's program. As an example, if L were three, C$ would end up with the value S3G1, which is the value in the third data statement.

Line 320 of our simulator program displays the current values in the registers, and the next program line to be executed by MINIMALC1. This produces the trace which you see on your screen when the simulation program is running.

Line 400-520 look at the command in C$ and decide what to do. The first character of the command is stored in the variable C1$. This will be either an A, S, or H, signifying the three possible commands.

If the command is an A command or an S command, then the second character in the command will be a number from one to five, indicating which register to be operated on. The value of this number is stored in the variable RN.

Depending on the value of C1$, the computer will either branch to line 600 (if C1$ = "A"); branch to line 700 (if C1$="S");or END (if C1$="H").

The next section of the simulator program, lines 600-610, is what is executed in the case of an A command (i.e., C1$ = "A"). The appropriate register is increased in value by one. The line counter L is increased by one. And then the simulator branches back to line 300, to execute the next command in MINIMALC1's program.

The next section, lines 701-750 is what is executed in the case of an S command (i.e., C1$ = "S"). The S command performs different actions, depending on whether the value of the appropriate register is zero or not.

If the value of the register is zero, then line 750 is executed. This sets the line counter L to a new line number. For instance, if the command in C$ were S1G4, then L would be set to four. After this is done, the simulator program goes back to line 300, to execute the next command in MINIMALC1's program.

If the value of the register were greater than zero, then lines 710-720 are executed. The appropriate register is decreased in value by one. The line counter L is increased by one. And then the simulator branches back to line 300, to execute the next command in MINIMALC1's program.

The last four lines of the simulator program are, of course, the data statements, which constitute MINIMALC1's program.

Remarks

To really get a feel for what MINIMALC is like, try writing some programs of your own for MINIMALC1. You can do this conveniently by means of the simulator program provided in this article. Enter your MINIMALC1 program as a series of data statements, starting at line 1001 of the simulator program. If your MINIMALC1 program needs for certain registers to be initialized before the program begins, take care of this in line 100 of the simulator program.

With sufficient cleverness, you can program MINIMALC1 to do anything that a big computer can do.

Here is a program which enables MINIMALC1 to multiply

```
1001  DATA "S1G9"
1002  DATA "S2G6"
1003  DATA "A3"
1004  DATA "A4"
1005  DATA "S5G2"
1006  DATA "S4G1"
1007  DATA "A2"
1008  DATA "S5G6"
1009  DATA "H"
```

To try out this program, substitute this set of DATA statements for the set of DATA statements which appeared in the BASIC program listing earlier in the article. Then run the BASIC program. You will see MINIMALC1 multiply together the values in registers R1 and R2, and store the final result in R3. If you would like to try writing some of your own programs for MINIMALC1, here are some suggestions. Try to program it to subtract, divide, do exponentiation, or determine whether a given number is prime. These programming problems range from moderately easy to moderately difficult.

A very challenging programming problem is to figure out how to do string manipulation with MINIMALC1. You might wonder how this could be possible at all, since MINIMALC1 only seems to deal with numbers, not strings. The "trick" is that it is possible to represent any string of characters as a huge number. For instance, in your Commodore computer, the character string CAB is sometimes represented as the following binary number: 0100001101000001 01000010. The base ten equivalent of this number is 4,407,618. By means of this trick, it is possible to convert all string manipulation problems into problems purely about numbers. Once this is done, it is possible for MINIMALC1 to perform the necessary manipulations. However, the manipulations generally turn out to be very difficult to program.

MINIMALC1, of course, does not have any peripherals such as a keyboard, screen, printer, disk drive, or joystick. However, if someone were actually to build a MINIMALC1, it would be possible to attach peripherals to the machine. All computer peripherals communicate with a computer by sending and receiving streams of numbers to and from the computer. We could interface a peripheral with MINIMALC1 by using one of the registers as a means of transmitting and receiving numbers to and from the peripheral. The programming would generally be very difficult, but it could be done.

MINIMALC1, and machines like it, have been studied extensively by computer scientists. It has been demonstrated that in principle, MINIMALC1 can be programmed to do anything that a big computer can do. The only catch is that the programming is often immensely difficult, and when the program is used, MINIMALC1 is liable to perform with staggering inefficiency. For some kinds of tasks, such as string manipulation, MINIMALC1 is generally so slow as to be absolutely useless for practical applications.

Despite its practical limitations, MINIMALC1 is a fascinating and important machine. It reveals clearly many of the fundamental aspects of computers: conditional branching, loops, complex manipulations of information memory, the reduction of information to numbers and codes, complex programs which consist essentially of a collection of relatively simple subroutines. MINIMALC1 also demonstrates some of the perennial problems of computer designers and programmers, such as tradeoffs between simplicity and efficiency or usefulness, the immense difficulty of designing large or complex programs without getting confused during the process, and problems of how to represent and organize information in a computer's memory. One way to make headway with difficult problems like these is to study them in the context of a minimal computer such as MINIMALC1, before studying them as they arise with larger computer systems.

MINIMALC1 is just one example of a broad variety of minimal computers. In a future article, we will examine another minimal computer, which was invented back in 1936. Known as the Turing Machine, it probably qualifies as the first modern computer, and it has deeply influenced the development of the computer field up to the present day.

BY HERMAN M. STEVENSON, Jr.

Periscope

for the Commodore 64

I originally wrote this program back in 1979 for the PET. The people around here had so much fun with it that I thought that I would rewrite it for the Commodore 64. The program shows that a good game with good graphics can still be made without sprites. Instructions for play are in the program itself.

Program Explanation

Line 5 has some unusual instructions. As you can see in the print statement, there is the word "LOCK". That is a control H character, and is the same as CHR$(8). It is used to hold the keyboard in graphic mode. The rest of the line pokes in the screen background colors for the game board. The variable TR is for poking the color location of the torpedoes minus the screen poke location.

Line 10 pokes in the sound for voice number one and line 15 for voice number three. (In this program we do not use voice number two.)

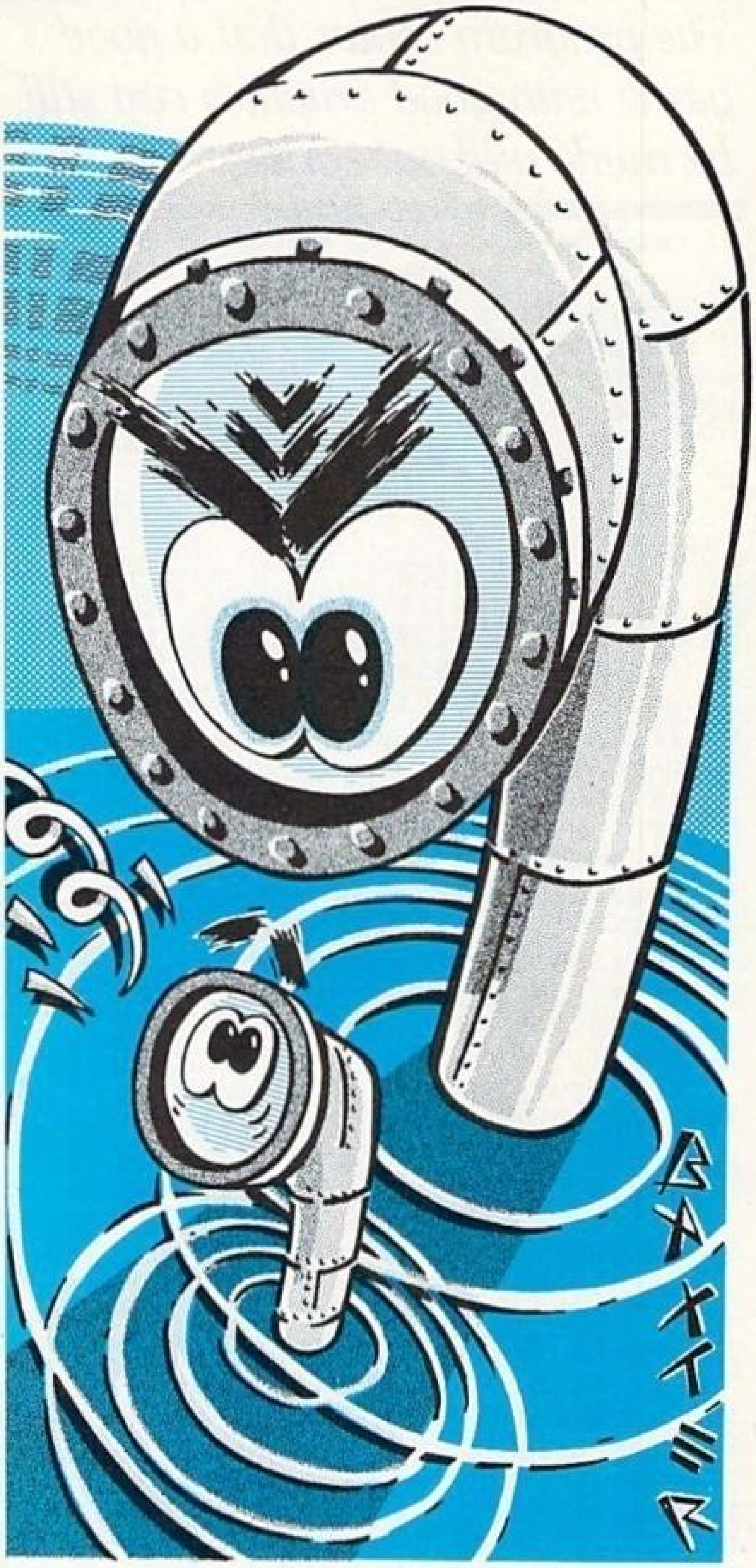
Let's jump back for a moment to line 5 to go over some of the GOSUB's. GOSUB 5000 sets our opening display. In line 25, GOSUB 5055 will ask us if we need the instruction routine. In line 30, GOSUB 1000 prints out the bow of our submarine. The rest of the line turns our sound on. Line 35 randomly selects the order of the boats that will run across the screen.

Line 40 checks to see when the score goes over 500 to give you your bonus torpedoes. Line 50 works with line 40 and keeps you from getting more then one bonus. Line 55 checks to see that line 35 only selects up to six boats. Line 60 sets the limits on the length of the game. Line 65 and 70 print the score at the bottom of the screen. Line 75 selects the boats to be printed. Lines 100 through 665 print the six boats at the top of the screen.

Lines 900 through 925 check to see if a torpedo is in motion. If so, it jumps to the correct POKE routine. Lines 930 and 935 jump to the start of each particular torpedo path when you press numbers one through six to fire them. Line 940 sends you back to the correct boat that is in motion. Lines 1500 through 1560 print your bonus statement. Lines 2000 through 4560 print out each of the six torpedo paths as selected by the GET statement. Lines 5070 through 5090 set the speed that the boats will travel across the screen.

Lines 5500 through 5815 are the instructions. Lines 6000 through 6070 add up your score and make the boats blow up. Lines 10000 through 10185 print out the game ending routines. They will also send you back for another game or let another person have a turn.

Two other points of interest. In the print statement in line 10070, there is the word "UNLOCK". This is a control I character, equivalent to CHR$(9). It resets the graphic shift key. Another item to note is in line 35, where the random generator selects the next boat. The generator will select from one to ten boats. I am sure you have noticed that there are only six boats to choose from. The reason for selecting ten is to cause a very small delay in starting the boats on their way. The time difference is small, but just enough to change a no-miss firing pattern that can occur when you time the boat speed. This will keep someone from just pushing a number to sink a boat every few seconds.



So far we have made a high score of 1030 points. If you get a higher score, please write me and let me know. I hope you have many hours of fun and enjoy the program as much as we have. ◼

Continued on next page

The program shows that a good game with good graphics can still be made without sprites.

Before typing this program, read "How to Enter Programs."

Periscope

```
5 PRINT"[CLEAR,LOCK,WHITE]"
  :POKE 53280,5:POKE 53281,14:TR=54272
  :GOSUB 5000'FFTM
10 POKE 54277,145:POKE 54278,128
   :POKE 54273,81:POKE 54272,1'ELOG
15 POKE 54290,16:POKE 54291,16
   :POKE 54292,64'DBEJ
20 GOTO 30'BCKX
25 GOSUB 5055'BEQE
30 GOSUB 1000:POKE 54286,33
   :POKE 54287,135:POKE 54290,129
   :POKE 54296,5'FQAK
35 P=INT(10*RND(0))'EIFI
40 IF S>=500 THEN 50'EGAD
45 GOTO 55'BCRF
50 IF N=0 THEN GOSUB 1500'EGFE
55 IF P>6 OR P<1 THEN 35'FGFK
60 IF J>=N+12 OR CT>25+(N*2)-I THEN
   10000'KSOM
65 PRINT"[HOME,DOWN23,WHITE]
   TORPEDO'S USED "J'BBAN
70 PRINT"[HOME,DOWN23,RIGHT27,WHITE]
   SCORE"S'BBBK
75 CT=CT+1:ON P GOTO 100,200,300,400,
   500,600'EFAQ
100 X=30'BDIV
105 X=X-1'CDLC
110 PRINT"[HOME]":POKE 54276,16
    :IF X=15 THEN POKE 54276,17'GVNE
115 PRINT TAB(X)"[BLUE,SPACE3,CMDR R,
    RVS,SHFT POUND,CMDR U] [RVOFF]
     "'CCEG
120 PRINT TAB(X)"[RVS,SHFT POUND,
    SPACE2]... [RVOFF] "'CCZB
125 IF X=0 THEN 155'DFHF
130 T=0'BCDY
135 T=T+1'CDCF
140 IF T<>I THEN 135'EFDC
145 GOTO 900'BDIF
155 PRINT"[UP,SPACE7]"'BALH
160 PRINT"[UP2,SPACE7]"'BAGD
165 GOTO 35'BCPG
200 X=1'BCIW
205 X=X+1'CDKD
210 PRINT"[HOME]":POKE 54276,16
    :IF X=10 THEN POKE 54276,17'GVIF
215 PRINT TAB(X)"[ORANGE,SPACE2,
    SHFT N,CMDR T,SHFT M,SPACE2]"'CCAH
220 PRINT TAB(X)"[BLACK] [CMDR *,
    CMDR O3,SHFT POUND] "'CCTE
225 IF X=30 THEN 255'DGIG
230 T=0'BCDA
235 T=T+1'CDCG
240 IF T<>I THEN 235'EFED
245 GOTO 900'BDIG
255 PRINT TAB(30)"[UP,SPACE6]"'CDAJ
260 PRINT TAB(30)"[UP2,SPACE6]"'CDVF
265 GOTO 35'BCPH
300 X=1'BCIX
305 X=X+1'CDKE
310 PRINT"[HOME]":POKE 54276,16
    :IF X=20 THEN POKE 54276,17'GVJG
315 PRINT TAB(X)"[CYAN] '[SHFT M,RVS,
    YELLOW,CMDR A,CMDR R,CMDR S]"'CCEJ
320 PRINT TAB(X)"[WHITE] [RVS,CMDR C,
    SPACE4,RVOFF,SHFT POUND]"'CCJD
325 IF X=30 THEN 355'DGJH
330 T=0'BCDB
335 T=T+1'CDCH
340 IF T<>I THEN 335'EFFE
345 GOTO 900'BDIH
355 PRINT TAB(30)"[UP,SPACE7]"'CDHK
360 PRINT TAB(30)"[UP2,SPACE7]"'CDDG
365 GOTO 35'BCPI
400 X=30'BDIY
405 X=X-1'CDLF
410 PRINT"[HOME]":POKE 54276,16
    :IF X=25 THEN POKE 54276,17'GVOH
415 PRINT TAB(X)"[L. RED] [RVS,CMDR V,
    CMDR C,CMDR U,CMDR V,CMDR C,RVOFF]
     "'CCIK
420 PRINT TAB(X)"[L. GREEN,CMDR *,RVS,
    BACK ARROW]::: [RVOFF] "'CCTF
425 IF X=0 THEN 455'DFKI
430 T=0'BCDC
435 T=T+1'CDCI
440 IF T<>I THEN 435'EFGF
445 GOTO 900'BDII
455 PRINT TAB(X)"[UP,SPACE7]"'CCVL
460 PRINT TAB(X)"[UP2,SPACE7]"'CCRH
465 GOTO 35'BCPJ
500 X=30'BDIA
505 X=X-1'CDLG
510 PRINT"[HOME]":POKE 54276,16
    :IF X=17 THEN POKE 54276,17'GVPI
515 PRINT TAB(X)"[WHITE]'[SHFT M,
    SHFT N,BROWN,CMDR L,CMDR J,WHITE,
    SHFT N,SPACE2]"'CCHL
520 PRINT TAB(X)"[CYAN,CMDR *,CMDR +5,
    CMDR K] "'CCPI
520 IF X=0 THEN 555'DFLE
530 T=0'BCDD
535 T=T+1'CDCJ
540 IF T<>I THEN 535'EFHG
545 GOTO 900'BDIJ
555 PRINT TAB(X)"[UP,SPACE7]"'CCVM
560 PRINT TAB(X)"[UP2,SPACE7]"'CCRI
565 GOTO 35'BCPK
600 X=0'BCHB
605 X=X+1'CDKH
610 PRINT"[HOME]":POKE 54276,16
    :IF X=5 THEN POKE 54276,17'GUUI
615 PRINT TAB(X)"[WHITE,SPACE2,SHFT M,
    SHFT ^3] "'CCOL
620 PRINT TAB(X)"[GRAY3] +[RVS]
    [RVOFF,CMDR O3,SHFT POUND]"'CCPI
```

```
625 IF X=30 THEN 655'DGMK
645 GOTO 900'BDIK
655 PRINT TAB(X)"[UP,SPACE7]"'CCVN
660 PRINT TAB(X)"[UP2,SPACE7]"'CCRJ
665 GOTO 35'BCPL
900 IF T1<>0 THEN 2005'EHSH
905 IF T2<>0 THEN 2505'EHYM
910 IF T3<>0 THEN 3005'EHVI
915 IF T4<>0 THEN 3505'EHBN
920 IF T5<>0 THEN 4005'EHYJ
925 IF T6<>0 THEN 4505'EHEO
930 GET F$:F=VAL(F$):IF F>6 THEN
    940'GORM
935 ON F GOSUB 2000,2500,3000,3500,
    4000,4500'CFYR
940 ON P GOTO 105,205,305,405,505,
    605'CYQM
1000 PRINT"[HOME,DOWN14,CYAN]"'BAHU
1005 PRINT"[SPACE19,SHFT N,SHFT M]
     "'BAYC
1010 PRINT"[SPACE18,SHFT N,SPACE2,
     SHFT M]"'BAGX
1020 PRINT"[SPACE16,SHFT U,SHFT N,
     SPACE4,SHFT M,SHFT I]"'BAKB
1030 PRINT"[SPACE15,SHFT U,SHFT N,
     SPACE6,SHFT M,SHFT I]"'BARC
1040 PRINT"[SPACE14,SHFT U,SHFT N,
     GRAY3].[BROWN,SPACE2,CMDR D,
     CMDR F,GRAY3,SPACE2].[CYAN,
     SHFT M,SHFT I]"'BAYH
1050 PRINT"[SPACE14,SHFT N,GRAY3]
     [SHFT B,BROWN,SPACE2,CMDR L,
     CMDR J,GRAY3,SPACE2,SHFT B,CYAN]
      [SHFT M]"'BAXI
1060 PRINT"[SPACE14,CMDR G,GRAY3]
     [BROWN,SPACE2,CMDR L,CMDR J,
     GRAY3,SPACE2].[CYAN] [CMDR M]
     "'BAJH
1070 PRINT"[SPACE14,CMDR G,GRAY3]
     [SHFT B,BROWN] [RVS,SHFT POUND,
     RVOFF,SHFT POUND,CMDR *,RVS,
     CMDR *,RVOFF,GRAY3] [SHFT B,CYAN]
      [CMDR M]"'BAUM
1080 PRINT"[CMDR T40,WHITE]"'BALC
1085 RETURN'BAQG
1500 Z=0:H=0'CFJA
1505 PRINT"[HOME,DOWN10]"'BAKE
1510 Z=Z+1'CDOB
1515 PRINT TAB(13)"[WHITE,RVS]
     BONUS SIX MORE "'CDYJ
1520 PRINT TAB(16)"[WHITE,RVS]
     TARPEDO'S"'CDQE
1525 H=H+1'CDDH
1530 IF H<>5 THEN 1525'EGXE
1535 PRINT"[HOME,DOWN10]"'BAKH
1540 PRINT TAB(13)"[SPACE16]"'CDAF
1545 PRINT TAB(16)"[SPACE9]"'CDKJ
1550 IF Z=10 THEN 1560'DHGG
1555 H=0:GOTO 1505'CHIK
1560 Z=0:H=0:N=6:RETURN'EJPI
2000 J=J+1:T1=1718'DKXX
2005 POKE T1,32'BFWA
2010 T1=T1-40:C1=T1+TR'ENAB
2015 POKE T1,81:POKE C1,6'CKMD
2020 IF X=10 THEN 2050'DHYY
2025 IF X=11 THEN 2050'DHAE
2030 IF X=12 THEN 2050'DHBA
2035 IF X=13 THEN 2050'DHCF
2040 IF X=14 THEN 2050'DHDB
2045 GOTO 2055'BEJE
2050 IF T1=1118 THEN 6000'DKYC
2055 IF T1<1118 THEN POKE T1,32:T1=0
     :RETURN'GQYL
2060 ON P GOTO 105,205,305,405,505,
     605'CYQF
2500 J=J+1:T2=1678'DKED
2505 POKE T2,32'BFXF
2510 T2=T2-40.5:C2=T2+TR'EPCG
2515 POKE T2,81:POKE C2,6'CKOI
2520 IF X=2 THEN 2550'DGHE
2525 IF X=3 THEN 2550'DGIJ
2530 IF X=4 THEN 2550'DGJF
2535 IF X=5 THEN 2550'DGKK
2540 IF X=6 THEN 2550'DGLG
2545 GOTO 2555'BEOJ
2550 IF T2=1111 THEN 6000'DKSH
2555 IF T2<1111 THEN POKE T2,32:T2=0
     :RETURN'GQUQ
2560 ON P GOTO 105,205,305,405,505,
     605'CYQK
3000 J=J+1:T3=1640'DKTY
3005 POKE T3,32'BFYB
3010 T3=T3-40:C3=T3+TR'ENIC
3015 POKE T3,81:POKE C3,6'CKQE
3020 IF X=12 THEN 3050'DHCA
3025 IF X=13 THEN 3050'DHDF
3030 IF X=14 THEN 3050'DHEB
3035 IF X=15 THEN 3050'DHFG
3040 IF X=16 THEN 3050'DHGC
3045 GOTO 3055'BEKF
3050 IF T3=1120 THEN 6000'DKTD
3055 IF T3<1120 THEN POKE T3,32:T3=0
     :RETURN'GQXM
3060 ON P GOTO 105,205,305,405,505,
     605'CYQG
3500 J=J+1:T4=1647'DKCE
3505 POKE T4,32'BFAG
3510 T4=T4-40:C4=T4+TR'ENMH
3515 POKE T4,81:POKE C4,6'CKSJ
3520 IF X=19 THEN 3550'DHOF
3525 IF X=20 THEN 3550'DHGK
3530 IF X=21 THEN 3550'DHHG
3535 IF X=22 THEN 3550'DHIL
3540 IF X=23 THEN 3550'DHJH
3545 GOTO 3555'BEPK
3550 IF T4=1127 THEN 6000'DKCI
3555 IF T4<1127 THEN POKE T4,32:T4=0
     :RETURN'GQIR
3560 ON P GOTO 105,205,305,405,505,
     605'CYQL
4000 J=J+1:T5=1688'DKIA
4005 POKE T5,32'BFBC
4010 T5=T5-39.5:C5=T5+TR'EPWD
4015 POKE T5,81:POKE C5,6'CKUF
4020 IF X=25 THEN 4050'DHHB
4025 IF X=26 THEN 4050'DHIG
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4030 IF X=27 THEN 4050'DHJC
4035 IF X=28 THEN 4050'DHKH
4040 IF X=29 THEN 4050'DHLD
4045 GOTO 4055'BELG
4050 IF T5=1135 THEN 6000'DKCE
4055 IF T5<1135 THEN POKE T5,32:T5=0
     :RETURN'GQKN
4060 ON P GOTO 105,205,305,405,505,
     605'CYQH
4500 J=J+1:T6=1729'DKFF
4505 POKE T6,32'BFCH
4510 T6=T6-40:C6=T6+TR'ENUI
4515 POKE T6,81:POKE C6,6'CKWK
4520 IF X=20 THEN 4550'DHHG
4525 IF X=21 THEN 4550'DHIL
4530 IF X=22 THEN 4550'DHJH
4535 IF X=23 THEN 4550'DHKM
4540 IF X=24 THEN 4550'DHLI
4545 GOTO 4555'BEQL
4550 IF T6=1129 THEN 6000'DKBK
4555 IF T6<1129 THEN POKE T6,32:T6=0
     :RETURN'GQQS
4560 ON P GOTO 105,205,305,405,505,
     605'CYQM
5000 Z=0:PRINT"[HOME,DOWN5]"'CDSY
5005 PRINT"PERISCOPE",'BBTF
5010 Z=Z+1'CDOA
5015 IF Z<>40 THEN 5005'EHEH
5020 Z=0:PRINT"[HOME,DOWN5]"'CDSB
5025 PRINT"[RVS]PERISCOPE",'BBMH
5030 Z=Z+1'CDOC
5035 IF Z<>40 THEN 5025'EHGJ
5040 V=V+1'CDGD
5045 IF V<>4 THEN 5000'EGDJ
5050 Z=0:V=0'CFXE
5055 PRINT"[WHITE,CLEAR]"
     :PRINT"DO YOU NEED INSTRUCTIONS?
     [SPACE2](Y/N)"'CBJR
5060 GET C$:IF C$=""THEN 5060'EJMH
5065 IF C$="Y"THEN 5500'DGKL
5070 PRINT"JUST HOW FAST ARE YOU?
     [SPACE2]1 TO 9"'BAYM
5075 PRINT"1 IS FAST[SPACE2]
     9 IS SLOW"'BAXO
5080 GET I$:IF I$=""THEN 5080'EJBJ
5085 I=VAL(I$):IF I<1 OR I>9 THEN
     5080'HOXR
5090 PRINT"[CLEAR,WHITE]":RETURN'CBYH
5500 PRINT"[CLEAR,WHITE]"'BAYD
5505 PRINT"[SPACE3]THE OBJECT OF THIS
     GAME IS TO SINK"'BAFQ
5510 PRINT TAB(13)"AS MANY BOATS"'CDKI
5515 PRINT"[SPACE3]AS YOU CAN WITH
     YOUR 12 TORPEDO'S."'BAJR
5520 PRINT TAB(16)"TO DO IT"'CDDH
5525 PRINT TAB(6)"YOU FIRE THEM FROM
     YOUR SUB."'CCLS
5530 PRINT"[SPACE5]BY USING ONE OF
     THE SIX TUBE'S"'BAOO
5535 PRINT TAB(14)"MARKED BELOW"'CDIP
5540 PRINT"[SPACE3]TUBE'S 2 AND 5
     FIRE ON A 30' ANGLE"'BAKO
5545 PRINT TAB(5)"ALL OTHERS FIRE
     STRAIGHT AHEAD"'CCRU
5550 PRINT:PRINT"[RVS,SPACE7]
     PRESS ANY KEY TO CONTINUE[SPACE8]
     "'CBNR
5550 GOSUB 1000'BECI
5560 POKE 1716,178:POKE 1717,62
     :POKE 1677,179:POKE 1678,62'EIVR
5565 POKE TR+1716,1:POKE TR+1717,1
     :POKE TR+1677,1:POKE TR+1678,
     1'IKIB
5570 POKE 1756,62:POKE 1755,177
     :POKE 1689,60:POKE 1690,180'EINS
5575 POKE TR+1756,1:POKE TR+1755,1
     :POKE TR+1689,1:POKE TR+1690,
     1'IKLC
5580 POKE 1731,181:POKE 1730,60
     :POKE 1772,182:POKE 1771,60'EIRS
5585 POKE TR+1731,1:POKE TR+1730,1
     :POKE TR+1772,1:POKE TR+1771,
     1'IKUC
5590 D=D+1'CDVN
5595 IF D<>25 THEN 5590'EHUU
5600 D=0'BCME
5605 POKE TR+1716,32:POKE TR+1717,32
     :POKE TR+1677,32:POKE TR+1678,
     32'IOPV
5610 POKE TR+1756,32:POKE TR+1755,32
     :POKE TR+1689,32:POKE TR+1690,
     32'IOSR
5615 POKE TR+1731,32:POKE TR+1730,32
     :POKE TR+1772,32:POKE TR+1771,
     32'IOWW
5620 GET E$:IF E$=""THEN 5560'EJVJ
5625 PRINT"[CLEAR]":PRINT'CBAM
5630 PRINT TAB(7)"FOR EACH BOAT THAT
     YOU SINK"'CCKO
5635 PRINT"[SPACE2]YOU WILL RECEIVE
     POINTS AS SHOWN BELOW"'BAFW
5640 PRINT"[WHITE,SPACE2,SHFT M,
     SHFT ^3] "'BADL
5645 PRINT"[GRAY3] +[RVS] [RVOFF,
     CMDR O3,SHFT POUND,WHITE,SPACE3]
     =100 POINTS[SPACE5]
     TROOP CARRIER"'BAQY
5650 PRINT'BACI
5655 PRINT"[L. RED] [RVS,CMDR V,
     CMDR C,CMDR U,CMDR V,CMDR C,
     RVOFF] "'BAWS
5660 PRINT"[L. GREEN,CMDR *,RVS,
     BACK ARROW]::: [RVOFF,WHITE,
     SPACE4]=50 POINTS[SPACE6]
     OCEAN LINER"'BAXT
5665 PRINT'BACO
5670 PRINT"[WHITE]'[SHFT M,SHFT N,
     BROWN,CMDR L,CMDR J,WHITE,SHFT N,
     SPACE2]"'BAVP
5675 PRINT"[CYAN,CMDR *,CMDR +5,
     CMDR K,WHITE,SPACE3]=40 POINTS
     [SPACE6]CARGO SHIP"'BAVC
5680 PRINT'BACL
5685 PRINT"[BLUE,SPACE3,CMDR R,RVS,
     SHFT POUND,CMDR U] [RVOFF] "'BATU
5690 PRINT"[RVS,SHFT POUND,SPACE2]
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     ... [RVOFF] [WHITE,SPACE2]
     =30 POINTS[SPACE6]PT BOAT"'BASU
5695 PRINT'BACR
5700 PRINT"[CYAN] '[SHFT M,RVS,YELLOW,
     CMDR A,CMDR R,CMDR S]"'BATJ
5705 PRINT"[WHITE] [RVS,CMDR C,SPACE4,
     RVOFF,SHFT POUND,SPACE3]
     =20 POINTS[SPACE6]TUG BOAT"'BAAS
5710 PRINT'BACF
5715 PRINT"[ORANGE,SPACE2,SHFT N,
     CMDR T,SHFT M,SPACE2]"'BATN
5720 PRINT"[BLACK] [CMDR *,CMDR O3,
     SHFT POUND,WHITE,SPACE4]
     =10 POINTS[SPACE6]SAIL BOAT"'BAWR
5725 PRINT:PRINT"[RVS,SPACE7]
     PRESS ANY KEY TO CONTINUE[SPACE8]
     "'CBNV
5730 GET C$:IF C$=""THEN 5730'EJQL
5735 PRINT"[CLEAR,DOWN3]"'BAUN
5740 PRINT TAB(8)"THEIR IS A SPECIAL
     BONUS"'CCSQ
5745 PRINT TAB(6)"IF YOU SCORE OVER
     [RVS]500[RVOFF] POINTS"'CCWW
5750 PRINT TAB(7)"YOU GET SIX MORE
     TORPEDO'S"'CCER
5755 PRINT TAB(8)"THERE WILL BE A
     MAXIMUM"'CCWV
5760 PRINT TAB(10)"OF 24 BOATS TO
     PASS"'CDMQ
5765 PRINT" THE NUMBER IN THE CONVOY
     WILL BE LESS"'BAWA
5770 PRINT" AS YOU CHOOSE A LOWER
     NUMBER IN SPEED"'BANV
5775 PRINT TAB(5)"EXAMPLE
     : A SPEED OF 1=24 BOATS"'CCBA
5780 PRINT TAB(9)"A SPEED OF 9=16
     BOATS"'CCDS
5785 PRINT TAB(7)"[RVS]NOTE[RVOFF]
     : WHEN IN BONUS TIME"'CCCA
5790 PRINT"[SPACE3]YOU GET ANOTHER
     CONVOY OF 12 BOATS"'BASX
5795 PRINT TAB(13)"SO GOOD LUCK!"'CDUX
5800 PRINT"AND TRY TO BEAT THE TOP
     SCORE OF THE DAY"'BANQ
5805 PRINT:PRINT"[RVS,SPACE7]
     PRESS ANY KEY TO CONTINUE[SPACE8]
     "'CBNU
5810 GET C$:IF C$=""THEN 5810'EJPK
5815 PRINT:PRINT:GOTO 5070'DGAN
6000 IF P=1 THEN S=S+30'FGBC
6005 IF P=2 THEN S=S+10'FGAH
6010 IF P=3 THEN S=S+20'FGCD
6015 IF P=4 THEN S=S+50'FGGI
6020 IF P=5 THEN S=S+40'FGGE
6025 IF P=6 THEN S=S+100'FHCJ
6030 E=16:POKE 54276,129'CNEE
6035 E=E-1'CDYI
6040 PRINT"[HOME]"'BAVC
6045 PRINT TAB(X)"[WHITE,CMDR +7]
     "'CCHN
6050 PRINT TAB(X)"[WHITE,CMDR +7]
     "'CCHJ
6055 PRINT TAB(X)"[BLACK,UP,SPACE7]
     "'CCQL
6060 PRINT TAB(X)"[BLACK,UP2,SPACE7]
     "'CCGI
6065 POKE 54296,E:IF E<>5 THEN
     6035'FOQP
6070 POKE 54276,16:GOTO 35'CLRI
10000 PRINT"[WHITE,CLEAR,DOWN2]"
      :POKE 54296,0'CINT
10005 IF S>HS THEN 10150'DIYY
10010 PRINT TAB(5)"YOU HAVE SCORED
      "S" POINTS"'CDLA
10015 PRINT'BACW
10020 R=R+1'CDXU
10025 PRINT TAB(3)"THE TOP SCORE OF
      THE DAY WAS"HS'CEBB
10030 PRINT:PRINT"[SPACE2]
      WOULD YOU LIKE TO TRY AGAIN?
      (Y/N)"'CBGE
10035 GET Q$:IF Q$=""THEN 10035'EKLD
10040 IF Q$="Y"THEN 10075'DHAX
10045 PRINT:PRINT TAB(9)"IS THEIR ANY
      ONE ELSE"'DDNC
10050 PRINT TAB(5)"WHO WOULD LIKE TO
      PLAY? (Y/N)"'CCVF
10055 GET Q$:IF Q$=""THEN 10055'EKNF
10060 J=0:N=0:S=0:R=0:CT=0'FPME
10065 IF Q$="Y"THEN 5'DDGE
10070 PRINT:PRINT"[RVS]
      IT'S BEEN FUN GOOD-BYE![UNLOCK]"
      :POKE 198,0:END'EISB
10075 J=0:N=0:CT=0:IF R>4 THEN
      10085'GRIE
10080 S=0:GOTO 25'CFTB
10085 PRINT"[WHITE,CLEAR,DOWN10]"'BATF
10090 PRINT TAB(6)"YOU ALREADY TRIED
      "R" TIMES"'CDVC
10095 PRINT'BACF
10100 PRINT TAB(9)"LAST TIME YOU
      PLAYED"'CCUY
10105 PRINT'BACW
10110 PRINT TAB(7)"USING A SKILL
      SPEED OF "I'CDBA
10115 PRINT'BACX
10120 PRINT TAB(9)"PLEASE TRY A LOWER
      ONE"'CCXB
10125 PRINT'BACY
10130 PRINT:PRINT"[RVS,SPACE7]
      PRESS ANY KEY TO CONTINUE
      [SPACE6]"'CBZF
10135 GET Q$:IF Q$=""THEN 10135'EKME
10140 S=0:J=0:N=0:PRINT"[CLEAR]"'EJHB
10145 GOTO 25'BCOB
10150 PRINT"[CLEAR]"'BATX
10155 PRINT TAB(12)"[RVS]
      CONGRATULATIONS!"'CDJC
10160 PRINT" YOU HAVE BEAT THE TOP
      SCORE OF THE DAY"'BAIC
10165 PRINT TAB(11)"WITH "S"
      POINTS"'CEYC
10170 PRINT'BACY
10175 HS=S'BDJF
10180 R=0:S=0:J=0:N=0:CT=0'FPMB
10185 GOTO 10030'BFYA
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END

BY MARK JORDAN

Letter Getter

for the Commodore 64

Find the letters and form words in this uniquely computeristic game.

Letter Getter is a computer word game. While it borrows from many of the conventional paper-and-pencil games as well as popular board games, it is uniquely a computer contest. For one thing, it requires two joysticks and a certain amount of manual dexterity. For another, the computer does all the bookkeeping such as keeping score, arranging letters in columns, and timing the event. Also, the machine sets the game up with a ten-by-ten grid of random letters, which it then conceals.

To help you with your task of revealing those hidden letters, the game makes use of a peculiar feature of the 64—sprite-to-background priority. Normally, this byte is exercised to make sprites appear somewhat three-dimensional. But in Letter Getter, the effect is one of creating a "sprite window" to rove the screen, pulling the curtains on hidden letters. With this in mind, I chose an eyeball shape for each player to maneuver.

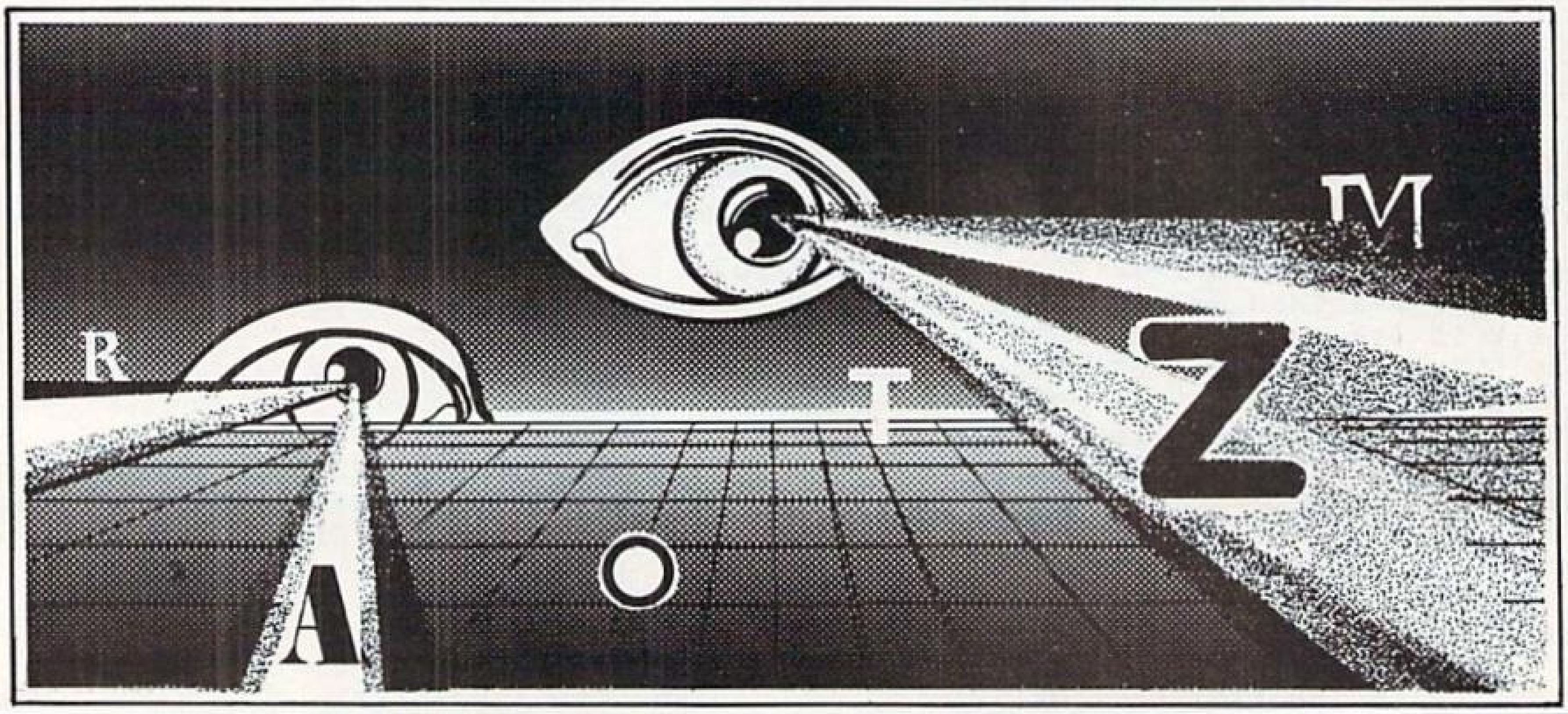
The game begins with each player manning a joystick. A ten-by-ten grid of randomly chosen letters is seen briefly and then vanishes. When the eyeball sprites appear, the players begin scanning the screen for the hidden letters out of which to form words. When a desirable letter is found, a hit on the firebutton will cause it to appear in the proper player's column. Some letters—f, h, k and y—are worth bonus points (two apiece). Others—j, q, x and z—net the user five extra points.

Another thing happens when a player takes a letter: it lights up on the screen. And not just lights up, but lights up in the same color as the opponent's sprite. In other words, if player one controls the white sprite and he finds an "E" he needs, after he has triggered on the "E," it will light up in black. As the game progresses the screen becomes littered with lit-up letters. Why? Because now player two, who controls the black sprite, can re-use that "E." This beats scanning the entire screen for letters. So if player two does indeed need an "E," spots the black one and gets it, guess what happens to the "E?" You're right, it changes to white and is now available for player one to re-re-use. I might mention that E's are plentiful and likely not worth chasing down in Letter Getter, but Z's and J's are. This can become a strategy in itself—the opponent has little time to re-utilize them.

You may be wondering why the letters change to the color of the opponent's sprite. Doesn't that make it impossible to see a letter when the eyeball is centered on top? Well, not impossible, but at least it makes centering atop the letter a tad harder than normal. I mean, even freebies aren't totally free.

Confused? Don't be. One round (they last about four and a half minutes) of Letter Getter will clear up any mysteries.

Obviously, the goal of Letter Getter isn't just to light up letters. The goal is to form as many words as possible in your column, the bigger the better (but no longer than eight letters). Player one's column is left of the grid, player two's is to the right. As you collect letters *en route* to words, you may make a mistake or two. No problem. To blank out the previous letter, move your sprite down to the center of the grid where a blank box is and fire on it. This will remove your mistake. When you've finished a word, you'll need to inform the computer so it won't chain your words together. This is accomplished by moving your sprite to any spot on any



of the 11 horizontal lines on the screen and pressing the fire button. The computer now knows to drop down and begin forming another word.

With approximately 30 seconds to go in the round, the computer will sound a warning hum. At game's end a siren will whine.

At the beginning of the game, you are asked to set the minimum word length. With my six year-old son Nat playing, we set it at three. This means that any two-letter words either of us forms will yield a negative score. (Nat's idea of huge joke is to set it for one-letter words and then immediately find all the I's and A's. Funny, maybe, to a six year-old, but not that funny.) The default is set at four-letter words.

Scoring depends on what length minimum you set. It works like this: With a three-letter minimum you get three points for each three-letter word, six for each four-letter word, nine for each five-letter word, and so on up to 18 for each eight-letter word. With a four-letter minimum, four-letter words net four points, five get seven, on up to 16 for eight-letter words.

The computer does all the scoring for you so you don't even have to know how it works. One thing it won't do, however, is to decide which of the entries are words and which are typos, misspellings, and fabrications. So at the completion of each round, it will prompt the players with a pointer aimed one at a time at each word. If the word is okay, touching any key will lock it in. If it's faulty, the S key will erase it. When all the words are finished, the computer will spend two or three seconds to tally the scores, which it will report next to each player's name. It also will tabulate total rounds won. Finally, you'll be given the opportunity to play again.

I used the Scrabble letter-frequency distribution in this game with a few minor modifications. I eliminated one "G" (to make "ING" suffixes less available) and added a "K." By tampering with lines 80-90, you can rearrange the distribution to satisfy yourself.

This game features a machine language subroutine for reading joysticks, moving sprites, controlling letters, creating sound effects, and keeping time. Clumps of hair on my livingroom floor testify to the fact that it was my first machine language effort. It was worth it. I would encourage all would-be game designers to take a stab at machine language. The ability to move sprites smoothly in machine language will make you marvel.

Before typing in this program, read "How to Enter Programs."

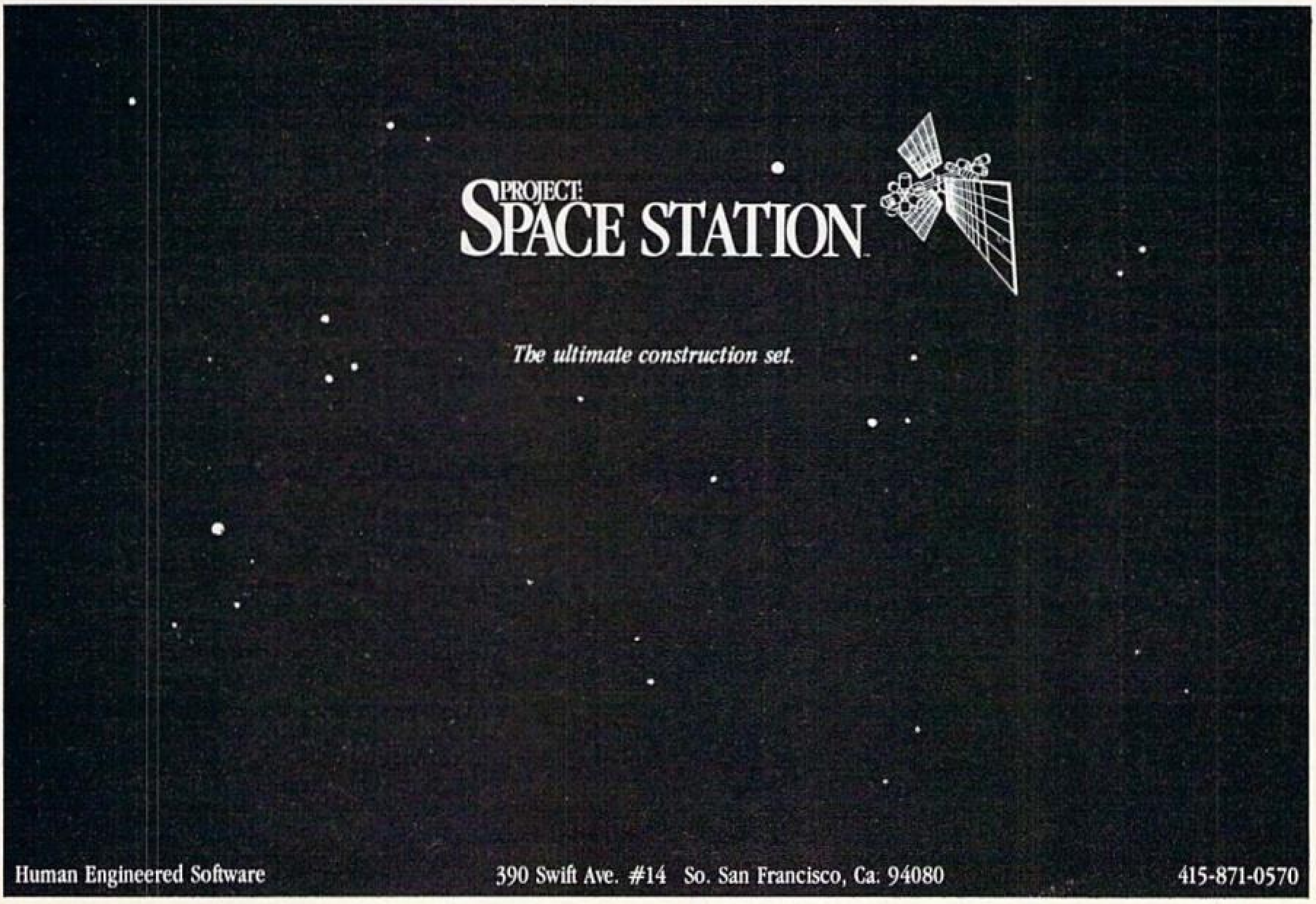
Letter Getter

```
10 DIM L$(100):AD=0:AC=0:BC=0:AC=48
   :BC=AC:WF=1:GOSUB 185'IMTK
15 POKE 53281,15:POKE 53280,0'CQPG
20 PRINT"[BLACK,CLEAR,DOWN3]
   TYPE NAME OF PLAYER 1 (JOY/PORT 2)"
   :INPUT P1$'CEQK
25 PRINT"[DOWN2]TYPE NAME OF PLAYER 2
   (JOY/PORT 1)":INPUT P2$'CESN
30 L%=(10-LEN(P1$))/2:LL%=(10 LEN(P2$)
   )/2'IBHJ
35 MN=4:INPUT"[DOWN3]MINIMUM WORD
   LENGTH";MN'CHEM
40 PRINT"[CLEAR]"SPC(L%)P1$,,"[WHITE]
   "SPC(LL%)P2$'DQEF
45 IF AD>1 THEN FOR T=0 TO 39
   :POKE 1024+T,PEEK(50000+T)
   :POKE 55296+T,0:NEXT'NHAU
50 SC=1024:C=55296:R=INT(RND(0)*100)
   +1'HYYK
55 FOR T=1 TO 100:READ A$:L$(T)=A$
   :NEXT'GRCN
60 PRINT"[L. BLUE,HOME,DOWN2]"
   :FOR T=1 TO 10:PRINT"[SPACE9,RIGHT]
   ";:FOR TT=1 TO 9:PRINT L$(R)" ";
   'JTPO
65 R=INT(RND(0)*100)+1:NEXT'GLAN
70 PRINT L$(R):PRINT:NEXT'DHIG
75 FOR T=1 TO 1000:NEXT'EHQL
80 DATA A,A,A,A,A,A,A,A,A,B,B,C,C,D,D,
   D,D,E,E,E,E,E,E,E,E,E,E,E,E,F,
   F'BLNR
85 DATA G,G,H,H,I,I,I,I,I,I,I,I,I,J,K,
   K,L,L,L,L,M,M'BSTT
87 DATA N,N,N,N,N,N,O,O,O,O,O,O,O,O,P,
   P,Q,R,R,R,R,R,R'BUPW
90 DATA S,S,S,S,T,T,T,T,T,T,T,T,U,U,U,
   U,V,V,W,W,X,Y,Y,Z'BWQR
95 POKE 53281,14:PRINT"[BLACK]"'CJRN
100 PRINT"[HOME,DOWN]";
    :PRINT,"[GRAY3,LEFT,CMDR P5,RVS,
    SPACE2]T I M E[SPACE2,RVOFF,
    CMDR P5]":PRINT,"[LEFT,SHFT B]",,
    "[LEFT,SHFT B]"'DHAL
105 FOR T=1 TO 10:PRINT,"[LEFT,SHFT B]
    ",,"[LEFT,SHFT B]":PRINT,"[LEFT,
    SHFT B,SHFT *19,SHFT B]":NEXT'GLIA
110 PRINT,"[UP,LEFT,CMDR Y21]"'BBNN
115 PRINT"[RVS,WHITE]BONUS 2 = F H K
    Y[SPACE3,BLACK,SPACE3]
    J Q X Z = BONUS 5[RVOFF,GRAY3]";
    'BBKM
120 PRINT,,"[UP13,LEFT2,RVS,SPACE3,
    DOWN,LEFT3,SPACE3,DOWN,LEFT3,
    SPACE3,RVOFF]"'BCYM
125 FOR SP=12288 TO 12350:READ S
    :POKE SP,S:NEXT'GUKK
130 FOR SP=12352 TO 12369:POKE SP,255
    :NEXT'FUPF
135 FOR SP=12370 TO 12414:POKE SP,0
    :NEXT'FSEJ
140 V=53248:POKE V+21,12:POKE V+39, 1
    :POKE V+40, 0:POKE V+1,106
    :POKE V+3,106'LOKO
145 POKE V+4,38:POKE V+6,86
    :POKE V+5,58:POKE V+7,58
    :POKE 2042,193:POKE 2043,193'KQIT
150 POKE V+41,14:POKE V+42,14'ENJF
155 POKE V,117:POKE V+2,197
    :POKE 2040,192:POKE 2041,192
    :POKE V+27,3:POKE V+29,15'JSRT
160 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,1,255,0,7,255,192,15,255,
    224'BOVN
165 DATA 31,255,240,63,255,248,63,255,
    248,63,255,248,31,255,240,15,255,
    224'BPET
```

```
170 DATA 7,255,192,1,255,0,0,0,0,0,0,
    0,0,0,0,0,0,0'BQBK
175 IF AD=0 THEN FOR T=49152 TO 49597
    :READ Y:POKE T,Y:NEXT'JVPR
180 POKE V+21,15:SYS 49555:WF=2'EQRJ
185 S=54272:FOR L=S TO S+24:POKE L,0
    :NEXT'HRFQ
190 POKE S+5,15:POKE S+1,7:POKE S,112
    :POKE S+24,15:POKE S+6,250'JFUQ
195 POKE S+4,33:FOR I=15 TO 0
    STEP-5'HLKP
200 FOR T=1 TO 255 STEP 5:POKE S,T
    :NEXT'GLDC
205 FOR T=255 TO 1 STEP-32:POKE S,T
    :NEXT'HMRI
210 POKE S+24,I:NEXT I:POKE S+4,
    32'FNHD
215 POKE S+24,15:IF WF=1 THEN 15'FMVH
220 POKE 198,0:POKE V+21,0'DLLC
225 PRINT"[HOME,DOWN3]":FOR T=1 TO 19
    :PRINT,"[SPACE19]":NEXT'GIYK
230 PRINT"[HOME,DOWN3,BLACK]","
    [SPACE3]FOLLOW POINTER[SPACE2]
    "'BBRF
235 PRINT       ,"[SPACE3]
    TO CHECK WORDS[SPACE2]"'BBOJ
240 PRINT:PRINT,"[SPACE5]PRESS [RVS]
     S [RVOFF,SPACE3]"'CCFF
245 PRINT       ,"[SPACE3]
    TO REMOVE WORD: "'BBUK
250 PRINT:PRINT,"[SPACE3]ANY OTHER
    [SPACE2]KEY[SPACE2]"'CCUG
255 PRINT       ,"[SPACE6]IF OKAY
    [SPACE6]"'BBUK
260 X=8:G=188:D=0:H=80'EOSI
265 POKE SC+H+X,G:POKE C+H+X,.'GMUN
270 IF PEEK(SC+H+40)=32 THEN H=H+40
    :IF H<875 THEN 270'LVEO
275 GET A$:IF A$=""THEN 275'EINM
280 IF A$="S"THEN FOR T=0 TO 7
    :POKE SC+H+T,32:NEXT'KOKN
285 IF H>875 THEN H=72:D=D+2:G=190
    :X=-1'JTKT
290 IF D>2 THEN 300'DFKH
295 H=H+40:GOTO 265'DIAN
300 H=80:SR=0'CHJA
305 CC=0:FOR TT=1 TO 22:G=0:B=0'GPSJ
310 FOR T=0 TO 8:PL=PEEK(SC+H+T)'HMEF
315 IF PL>26 AND G>0 THEN
    CC=CC+(G-MN)*2+G+B:T=8
    :GOTO 335'NAXR
320 IF PL>26 THEN T=8:GOTO 335'FKFE
325 G=G+1:IF PL=10 OR PL=24 OR PL=26
    OR PL=17 THEN B=B+5'NXWS
330 IF PL=6 OR PL=8 OR PL=11 OR PL=25
    THEN B=B+2'LRTL
335 NEXT'BAEF
340 H=H+40:NEXT'DFME
345 IF SR=0 THEN AA=CC:PRINT"[HOME,
    RVS,RIGHT]","[SPACE3,LEFT3]"AA
    :H=112:SR=SR+1:GOTO 305'JBNU
350 BB=CC:PRINT"[HOME,RVS]",,,"[LEFT3,
    SPACE3,LEFT3]"BB'CKHJ
355 PRINT"[HOME,DOWN22,SPACE12]
    PLAY AGAIN?[SPACE2]Y/N[SPACE10]
    "'BAYP
360 IF AA>BB THEN AC=AC+1:POKE 1040,AC
    :POKE 55310,2'HAPM
365 IF BB>AA THEN BC=BC+1:POKE 1048,BC
    :POKE 55322,1'HADR
370 GET A$:IF A$="N"THEN PRINT"[HOME]"
    :END'GGLJ
375 IF A$<>"Y"THEN 370'EFNM
380 FOR T=0 TO 39:POKE 50000+T,
    PEEK(SC+T):NEXT'ISAO
385 PRINT"[CLEAR]":RESTORE:AD=2
    :GOTO 45'EISO
390 DATA 169,0,133,82,133,83,169,
    4'BASL
395 DATA 133,94,133,96,169,80,133,
    93'BCDQ
400 DATA 169,112,133,95,169,117,133,
    81'BEPE
405 DATA 169,17,133,80,169,255,133,
    79'BDBJ
410 DATA 76,60,192,198,79,165,79,
    208'BCVE
415 DATA 18,234,169,255,133,79,238,
    4'BCEJ
420 DATA 208,238,6,208,173,4,208,
    197'BCYF
425 DATA 81,240,97,96,162,2,160,1'BYOK
430 DATA 185,0,220,41,31,201,31,
    208'BBOG
435 DATA 13,76,133,192,162,0,136,
    240'BCEL
440 DATA 239,160,1,76,60,192,201,
    15'BBHH
445 DATA 208,3,32,182,192,201,30,
    240'BCVM
450 DATA 15,201,29,240,17,201,27,
    240'BCUI
455 DATA 19,201,23,240,21,76,133,
    192'BCCN
460 DATA 222,1,208,76,133,192,254,
    1'BBGJ
465 DATA 208,76,133,192,222,0,208,
    76'BCOO
470 DATA 133,192,254,0,208,32,35,
    192'BCIK
475 DATA 132,78,160,8,232,208,253,
    136'BDOP
480 DATA 208,250,164,78,173,4,208,
    201'BDML
485 DATA 128,208,179,96,165,80,201,
    17'BDAQ
490 DATA 240,6,141,4,212,76,76,
    192'BAMM
495 DATA 141,4,212,169,32,133,80,
    169'BCKR
500 DATA 118,133,81,76,76,192,169,
    0'BBAE
505 DATA 133,89,133,91,169,4,133,
    90'BBWJ
510 DATA 169,216,133,92,132,78,189,
    0'BCAF
```

```
515 DATA 208,56,233,2,74,74,74,
    133'BASK
520 DATA 88,189,1,208,56,233,39,
    74'BAJG
525 DATA 74,74,133,87,168,24,165,
    89'BBOL
530 DATA 105,40,133,89,165,90,105,
    0'BBGH
535 DATA 133,90,24,165,91,105,40,
    133'BCEM
540 DATA 91,165,92,105,0,133,92,
    136'BBMI
545 DATA 208,227,164,88,177,91,41,
    15'BCCN
550 DATA 208,7,224,0,208,14,164,
    78'BANJ
555 DATA 96,201,1,208,7,224,0,240'BYZO
560 DATA 3,164,78,96,138,201,0,
    240'BAMK
565 DATA 2,169,1,145,91,177,89,
    201'BAVP
570 DATA 160,240,81,201,64,240,34,
    201'BDRL
575 DATA 32,240,14,224,0,208,13,
    164'BBTQ
580 DATA 82,192,8,240,20,145,93,
    230'BBKM
585 DATA 82,164,78,96,164,83,192,
    8'BAPR
590 DATA 240,7,145,95,230,83,164,
    78'BBYN
595 DATA 96,24,181,93,105,40,149,
    93'BBYS
600 DATA 181,94,105,0,149,94,224,
    0'BALF
605 DATA 240,2,162,1,169,0,149,82'BYHK
610 DATA 192,8,240,185,169,0,149,
    82'BBAG
615 DATA 169,32,145,89,164,78,224,
    1'BBDL
620 DATA 208,1,232,96,224,2,208,1'BYDH
625 DATA 202,180,82,240,19,214,82,
    180'BDGM
630 DATA 82,224,0,240,7,169,32,
    145'BAJI
635 DATA 95,164,78,96,169,32,145,
    93'BBSN
640 DATA 164,78,96,169,32,133,78,
    169'BCSJ
645 DATA 216,133,79,162,23,160,0,
    169'BCMO
650 DATA 1,145,78,200,192,16,208,
    247'BCNK
655 DATA 24,165,78,105,40,133,78,
    165'BCUP
660 DATA 79,105,0,133,79,160,0,
    202'BADL
665 DATA 208,229,76,0,192,0'BSEO
```

END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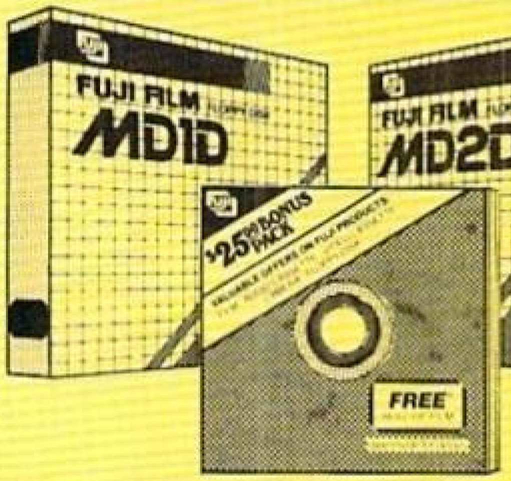

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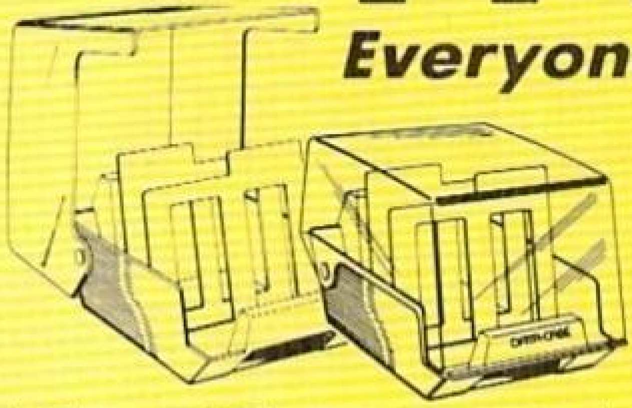

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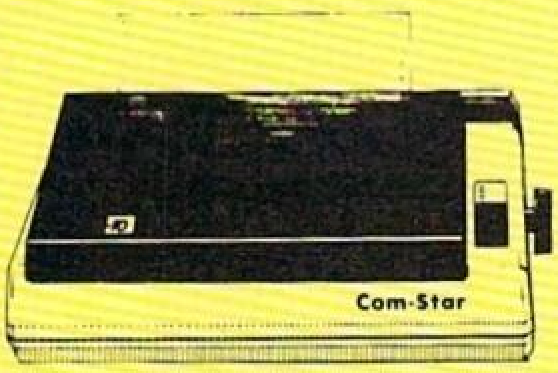

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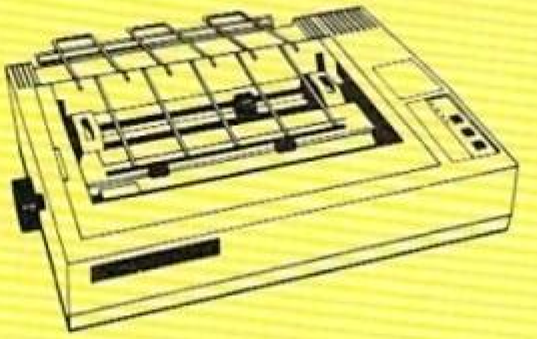

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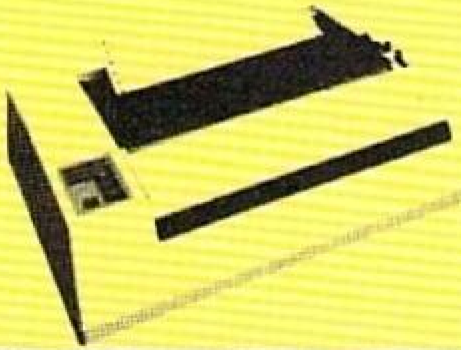

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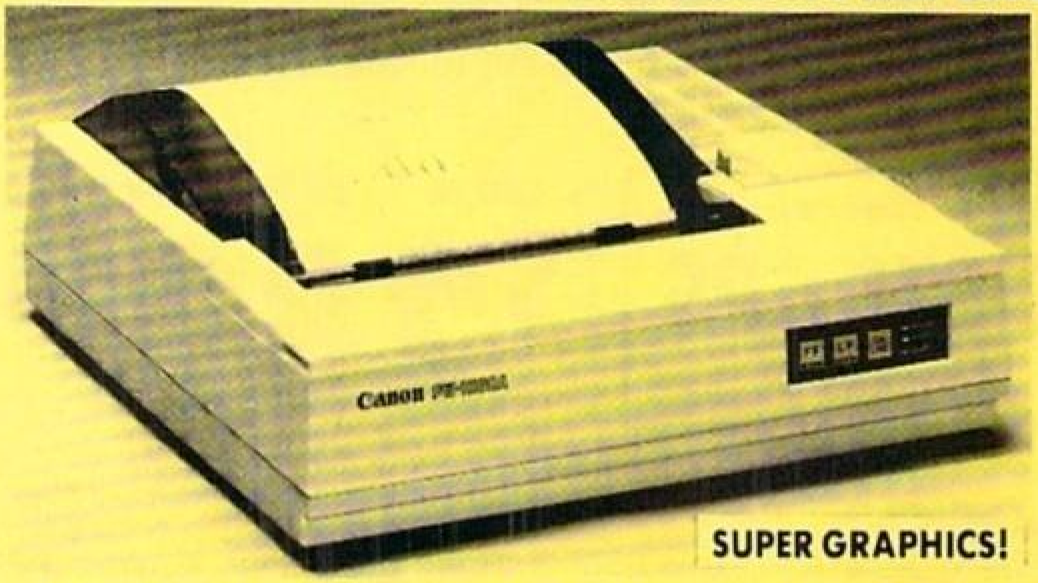

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SPECIFICATIONS

(IBM — Commodore)

Printing Method
Impact dot matrix

Printing Speed
160 CPS at standard character printing
27 CPS at NLQ character printing

Printing Direction
Text Mode — Bi-directional
Graphic Mode — Unidirectional

Print Head Life
100 million characters

Printing Characters
Standard 11 x 9 dot matrix
NLQ 23 x 18 dot matrix
Character size: 2 x 2.42 mm (standard)
Character set: Full ASCII character set (96), 32 special European characters

Down Loading
11 x 9 dot matrix; NLQ 23 x 18 dot matrix optional

Print Buffer
2K-byte utility buffer

Image Printing
Image Data: Vertical 8, 9 and/or 16 dot
Resolution: Horizontal 60 dots/inch
Horizontal 120 dots/inch (double density)
Horizontal 240 dots/inch (quadruple density)

Interface
8-bit parallel interface (Centronics type)

Paper
Plain paper, Roll paper, Single sheet, Fanfold, Multipart paper: max. 3 sheets (original plus 2)

(Apple — Atari — Etc.)

Ink Ribbon Cartridge
Ribbon Life: 3 million characters/cartridge

Maximum Number of Characters

Standard:	10 cpi	80 cpl
Enlarged:	5 cpi	40 cpl
Condensed:	17.1 cpi	136 cpl
Condensed enlarged:	8.5 cpi	68 cpl
Elite:	12 cpi	96 cpl
Elite enlarged:	6 cpi	48 cpl
NLQ pica:	10 cpi	80 cpl
NLQ pica enlarged:	5 cpi	40 cpl

Physical Dimensions
10": Size: 15¾" x 12 5/8" x 4 3/8"
Weight: 17.6 lbs.
15": Size: 23½" x 13 4/5" x 5 1/10"
Weight: 26.4 lbs.

Cartridge Ribbon. List $29.95. **Sale $14.95.**

Interfaces

IBM $89.00 **Apple $59.00** **Atari $59.00** **Commodore $39.00**

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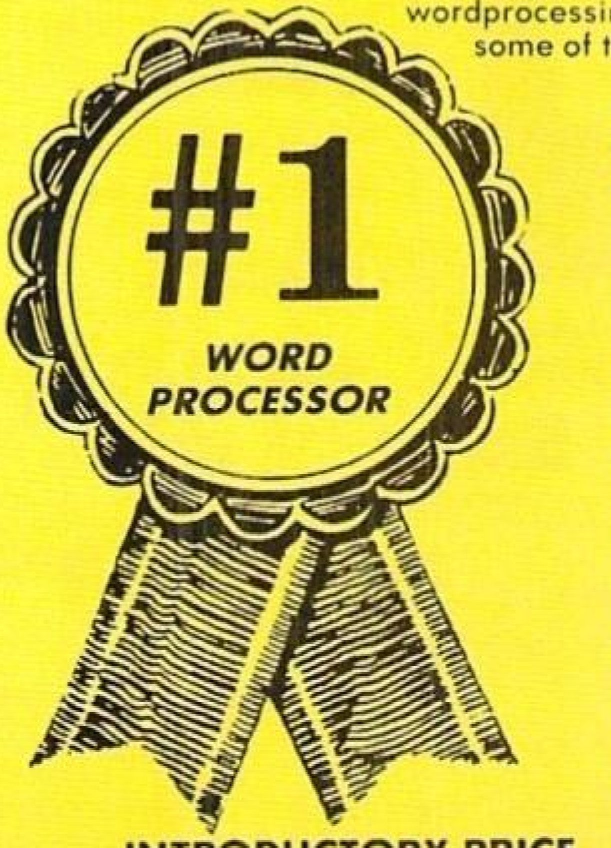

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- **Flexible Cursor Movement,** Including Tabs And Other Timesavers.
- **Deletion And Insertion** Of Characters, Lines And Blocks Of Text.
- **On-screen Text Enhancement**, Such As Bold Face, Italics, Underlining, Superscripts And Subscripts, And Foreign And Other Characters.
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USER GROUPS

Commodore user groups nationwide and around the world provide invaluable assistance to Commodore computerists. If you are looking for people who share your computing interests, or if you need help getting started with your computer, contact the group near you.

This list is compiled from groups who responded to a survey conducted by Pete Baczor, Commodore's user group coordinator. If you would like your group to appear here, or if you need information about Commodore's user group support, contact Pete at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.

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Birmingham Commodore
Computer Club
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4845 Avenue V Lot 7-B—35208

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Wiregrass Micro-Computer
Society
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Tom Wyatt
3868-H Rue Maison—36608

Pinson
Commodore Club—South
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Scottsboro
Scottsboro C-64 Users' Group
Richard Radon
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ALASKA

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Users Group
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Anchorage
Alaska 84 Commodore
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First City Users Group
Jim Llanos
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Sitka
Sitka Commodore Users Group
Dennis Lanham
P.O. Box 2204—99835

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Arizona VIC & 64 Users
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904 W. Marlboro Cir.—85224

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Gila Hackers
Paul R. Machula
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Phoenix Arizona Commodore
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Thunder Mountain Commodore
Users Gp
Jeff Tyler
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Computer Club
Mike LaPaglia
3371 S. Mormon Dr.—85730

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Users Group
Bob Brazeal
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Altaloma
Cactus Communicator
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Computer Club
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Auburn Commodore
Computer Club
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11210 Mira Loma Dr.—95603

Baldwin Park
Cal Poly Commodore Users
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David Dietzel
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Club 64
Robert Johnson
14944 Bayou Ave.—90706

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San Fernando Valley
Commodore Users Group
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21208 Nashville—91311

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Fresno 64 Users
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Diablo Valley Commodore
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Dean Steichen
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C Tech Users of Orange County
R. Stevenson
P.O. Box 1497—92626

Cupertino
PUG of Silicon Valley
Marvin Vander Kool
22355 Rancho Ventura—95014

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Hollywood
Hollywood Commodore
Users Group
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PALS
Jo Johnson
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San Luis Obispo Commodore
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Gary Bissell
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Nevada City
C64 Users Group
Gerry Friederici
11614 Red Dog Road—95959

Ojai
64/20 Club
Greg Burns
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CIVIC 64
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120 W. Magnolia Ave.—93030

Pasadena
P.C.A.C.C.
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San Carlos
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Stan Czernel
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Stratford
Commodore User Group of
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Dan Kern-Ekins
P.O. Box 1213—06497

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Ave.—06516

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31520

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Coeur d'Alene Computer Club
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Grangeville
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Computer Club
Jeanie Larson
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Spoon River College, RR #1—
61520

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Champaign Urbana Commodore
Users Group
Steve Gast
2006 Crescent Dr.—61821

Elgin
Fox Valley Commodore
Users Group
Herb Gross
833 Prospect—60120

Galesburg
Knox Commodore Club
Randy Fox
195 Olive St.—61401

Harvey
South Suburban V20 Users Club
Nick Forte
16409 Emerald—60426

Kankakee
Kankakee Hackers
Bill Brouillet
R.R. #2, Box 228-H—60901

Lincolnwood
C-64 Users Group, Inc.
David W. Tamkin
P.O. Box 46464—60646

Monmouth
Western Illinois Commodore
Users Group
Robert Cokel
906 W. 6th Ave.—61462

Peoria
Commodore Users of Peoria
Jeff Martin
1600 W. Devereux—61614

Rockford
Rockford Area Commodore
Computer Club
Kathe Heyer
2507 Pelham Rd.—61107

Scott AFB
Scott Computer Users' Group
Gilbert D. Helland
P.O. Box 397—62225

Springfield
Springfield PET Users Group
Bill Eardley
3116 Concord—62704

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Frank Nicholas
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47201

Indianapolis
VIC Indy Club
Fred Imhausen
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St.—46201

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Computer Club
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P.O. Box 58—50118

Waterloo
Waterloo Area Commodore Club
Rick Volker
945 Lowel—50702

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Hutchinson
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Viola
Commodore Users Group
of Wichita, Inc.
Walt Lounsbery
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Bardstown
Commodore Bardstown Users
Group
Patrick Kirtley
P.O. Box 165—40004

Bowling Green
Bowling Green Commodore
Users Group
Doug Skinner
P.O. Box 20214—42102

Glasgow
Glasgow Commodore
Users Group
Steve England
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Henderson
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Bill Walker
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Sulphur
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Fred White
99 Ann—70663

Swartz
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Beckie Walker
P.O. Box 175—71281

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Peter O'Brien
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Orano
Computer Society of Penobscot
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101 Crosby Lab, UMO—04469

Portland
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Ed Moore
10 Walker Street—04092

Scarborough
Y.U.G. (Scarborough)
George Caswell
16 Westwood—04074

Westbrook
Your Commodore Users Group
Mike Procise
P.O. Box 611—04092

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User Group Support Program

Commodore is creating a program to support Commodore User Groups. The two major components—approved user group status and a newsletter are now available.

Approved user group status is given to any user group meeting our basic criteria. These user groups receive meeting posters and membership cards and are automatically sent the newsletter each month. In addition they can request a speaker from Commodore to come and discuss (and demonstrate) new products at one of their meetings.

The newsletter, INPUT/OUTPUT, includes announcements, user group programs, calendar of events, letters, questions, product specifications, programs, and surveys. It is a newsletter FOR user groups BY user groups supported by Commodore without advertisements.

For future issues of the newsletter Commodore is accepting announcements of user group activities, articles of interest, letters to the editor, and general questions. Please forward all correspondence with the name of your user group to:

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
Attention either New User Group or Input/Output

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ALIVE AND WELL

Continued from page 87

to rectify a problem diagnosed by these programs. The programs will aid you in isolating where the problem originates, however, which will be useful in securing service for the device.

Disk drive head alignment in particular should never be attempted by the user. If your drive is out of alignment, refer servicing to an authorized service center. Attempting to realign a 1541 without the proper training, equipment and software will prove to be an exercise in futility, and may cause severe damage. Don't attempt it!

Mr. Tester from Micro-W Distributing is one of the better full-featured diagnostic programs that will test virtually all of your equipment for proper attention—disk drive, printer, keyboard, screen, SID chip, cassette and more. It's useful for diagnosing whether the equipment or software is at fault when operation goes awry. Once again, it won't cure your problem, but it will help you locate its source.

A fire extinguisher should be regarded as standard operational equipment, though hopefully you'll never have to use it. A word of caution is needed here, however. Never use a soda-acid or other wet-medium extinguisher on an electrical fire. A carbon dioxide or dry-powder unit is the only safe way to handle such fires, and there are several inexpensive units available on the market.

While the primary concern is one of putting the fire out as quickly and safely as possible, a secondary concern should be what effect the extinguishant will have on your computer equipment. Halon® 1211 is a chemical extinguishant that is perfectly safe for use on computer and other high-tech equipment which leaves no residue when it evaporates. Falcon and other manufacturers offer Halon® 1211 extinguishers at reasonable prices—remember that it's better to be safe than sorry.

When you consider all the hours of use and the demands put on your computer and peripherals, you'll agree that these marvelous devices require only a miniscule amount of care to keep them alive and well. If you're good to your equipment, your equipment will be good to you!

BEACH-HEAD II

Continued from page 40

ment. As a matter of fact, some of the cries are so realistic, that an option for voice suppression has been included to protect the impressionable.

The Dictator is back, but he's a welcome nemesis. Once again he can be tracked through a satisfying montage of arcade challenges created by a company that has quickly earned a reputation for pleasurable consistency. And as the Dragon plunges into the murky waters below, lanced a final time with a deadly poonta, one can't help but hope that his injuries aren't fatal, and that he might have enough strength to drag himself ashore. Then hopefully . . . one day . . . who knows? With a little luck, he might return again.

Battle Plans

A successful commander plans his strategies around the tendencies of his opponent, jumping at every chance to gain the upper hand. When squaring off against an untested human combatant, the only real preparation will come from reading the handful of tips in the documentation, and then spending some time practicing each scenario. But when you are up against the computer, there are some inherent patterns that you can use to your advantage.

Scene #1 "Attack"

If you chose to take the side of the Allied invasion force, remember the following: When you are dropping your paratroopers from the hovering chopper, the Dragon's machine gunner will only react to the soldiers once they touch the ground. The gunner will not follow your helicopter! The best strategy here is to move to one side, drop a couple of soldiers off, wait for the gun turret to swing over, then fly back to the other side to unload some more troops. The gun can't move quick enough to cover all the area at once, so if you have patience and keep repeating this flight pattern, you shouldn't lose a single soldier during the drop.

When you are storming the Dragon's sanctuary from the final wall, the Dictator's forces will always concentrate on the center grenadier. Move him out from behind the wall so you can see just a bit of his uniform. In this position he cannot be hit, but will still draw continuous fire from the gunner. This will allow ample time for the rest of your soldiers to come over the top of the wall and run past while the enemy puts on a futile shooting demonstration.

If you are backing the Dictator, a couple of pointers for you: Your machine gun can't keep up with their helicopter, so don't even try. When the Allies are parachuting and moving to the back wall, concentrate on covering only one side of the play field. If the Allies want to land a full force, they use both sides. This will give you a chance to put at least half of the enemy troops under heavy fire.

At the last wall, the Allies will send a grenadier out of the center opening during each two-man assault. Let the Allied companion go until after you get your shot at this more potent opponent.

Scene #2 "Rescue"

Allies: It is not always a good idea to keep your hostage moving at full speed, since this will also force you to shoot and hit quicker. Since only a limited number of enemy soldiers can be on the screen at one time, don't shoot an opposing man or machine unless he is an immediate threat to your hostage.

If your hostage is walking into a tight situation and it appears his end is imminent, shoot him. This will not be a death blow, but will instead stop him in his tracks while he turns and cries, "Hey, don't shoot me!" Not only is this response comical, but it buys you a few precious seconds while your man stands motionless, allowing you to clear the dangerous area with your fire.

Dictator: It is especially important that you crowd the screen in this phase. The computer sometimes has trouble designating the order in which the obstacles should be approached, and more often that not, this affords you some time to zero in on an escaping hostage.

Scene #4 "Battle"

Whatever side you happen to control, remember to keep moving, and to throw only one poonta at a time. The less time you're standing still, the harder it will be for the computer to track you down.

REVIEWED BY AL WILLEN

The Printer Book for the C-64/VIC 20

Authors: R. Bruckman, K. Gerits, T. Weins
Publisher: Abacus Software
P.O. Box 7211
Grand Rapids, MI 49510
Price: $19.95

A few months ago I ran into a technical roadblock that prevented the completion of a computing project I had undertaken. The problem was how to write a machine code routine that would dump output to a Commodore MPS-801 printer. Although I used the proper Kernal routines (and the routine worked for other printers), I wasn't getting anywhere with the MPS-801. Only after days of frustration did I hit upon the solution. I could have saved myself a lot of aggravation had I read Abacus' *The Printer Book for the C-64/VIC-20*. This book is not intended for casual reading, but is a central repository of facts concerning all Commodore and some non-Commodore printers.

Section One

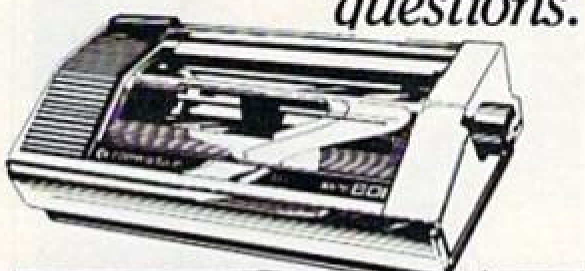
The first section—how to select a printer—is geared primarily for beginners, though some sections are very complex. Armed with the knowledge acquired in this section, a person can selectively shop for a specific printer, as determined by speed, character quality, interface considerations, graphics control, special character reproduction, pin control, and programming transportability.

The Printer Book covers interface and data-transfer methods rather extensively. All three data ports (Centronics/IEEE, serial, and parallel RS-232) are discussed. Also included are plans for building your own interface connections for printers, as well as for electronic typewriters.

Section Two

Section two compares the technical limits of every major class of printer (daisywheel, parallel matrix, serial matrix, and a drum plotter). First, the specifications of popular models within a printer class are given. Next, the electronic specs of any individual printers are supplied. Finally, special programming considerations are pinpointed.

The Printer Book *is a vital reference for all of your printer-related questions.*



Why is this important? Because it quickly shows programmers the ways to adapt a program so that it will work on a variety of machines. In programming, this is called transportability. Although a great many books cover computer and disk drive transportability, *The Printer Book* is the only book I know of which provides the comparative information needed to create printer transportability for Commodore printers.

After studying this book, you will be able to write a program for the MPS-801 printer as the default device, but with additional printer options for the VIC-1525, VIC-1526, and ASCII printers, such as the popular Epson line of printers. And best of all, you'll be able to write these routines—knowing that they'll work—without having to purchase every printer on the market! Your only investment is the cost of one book.

This section also includes an in-depth analysis of the Commodore MPS-801 printer, in which a lesson is devoted to the 8039 microprocessor (resident chip of the MPS-801), 8039 machine code rules, the 801's operating system overview, and 73 pages of documented MPS-801 ROM listings. If anything, you'll learn a great deal about the MPS-801.

Last but not least, Commodore's 1520 printer-plotter is examined in microscopic detail. This section is a "must" for 1520 owners who have, as I have, said to themselves, "Now that I own it, what can I do with it?" This section on the 1520 is so good that, had it been written when the 1520 first came out, I'm sure that both computer users and software developers would have taken the 1520 more seriously. Now, 1520 owners will be able to use this fantastic plotter to its full potential.

Section Three

This is a collection of viable programming solutions in both machine code and BASIC which, according to the authors, can be easily adapted as part of a subroutine in any program.

My favorite programs include a "device not present" routine, which senses if a printer is on-line, a "formatting numerical and alphanumerical data" routine, which lines up various types of data for neat printouts, and a "formatted program listing," which directs hard copy to be listed in a more structured and organized fashion. This section also includes a simple word processing program (written in machine language), a program which creates banners and posters, screen dump programs for text and high-resolution graphics, and various programs to print out three-dimensional graphics.

Section three concludes with a comprehensive BASIC program listing of graphic tracks which work on the 1520 printer-plotter. Some of these routines include algorithms to create a square, rectangle, cube, parallelogram, diamond, triangles (all types), pyramid, arcs, circle, ellipse, cone, and cylinder. Also shown are instructions on how to use the 1520 to represent statistical functions, bar charts, pie charts, and how to create "real time" graphics using the keyboard/joysticks. The book ends with a plotter utility program that extends BASIC with 16 additional graphic plot commands.

The Printer Book for the C-64/VIC-20 is a sound investment for people interested in buying a printer for the first time, and for more advanced programmers interested in having a "printer profile" on hand. Many users who purchase *The Printer Book* will find it to be a vital reference for all of their printer-related questions.

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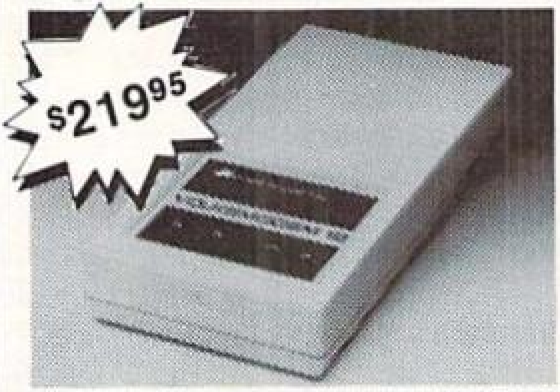

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KNIGHTS

Continued from page 42

later reloaded and continued.

The game can be fought using historically accurate probabilities or weighted in favor of one side. The "weighted" option, similar to a golfer's handicap, enables experienced players and novices to compete as equals. Four levels of difficulty are possible: novice, intermediate, historical and expert.

In *Knights of the Desert*, the keyboard, not the joystick, issues battle orders, and marching orders are issued by pressing the number keys. For instance, pressing "1" moves the selected unit north, "2" northeast, "3" east, and "4" southeast. This can easily lead to some wrong battle orders. Some might argue that this adds to the game's realism, since fortunes of battle have often been shifted by a single miscarried battle order.

There is also no option to list the directory of a disk when reloading a previously saved game. Without this option, you must either remember the file name, or turn off the 64, call up the directory, write the file name down, and then reload your game.

This is a game for lovers of strategy only. If you don't enjoy exercising that gray matter, this is not the game for you. The quickest way to lose in *Knights of the Desert* is to simply dash across the desert and attack the opposition. To win, you must give some forethought to each move. *Knights of the Desert* will test your wits, and maybe your patience, but if you are a fan of war games, you'll love every minute.

The copy-protected disk comes with a map, military unit symbols chart, and 26-page manual. Half of the pages in the manual are devoted to game rules, charts and tables. The remaining pages give a detailed history of the World War II battles fought in North Africa. Although reading the historical notes is not required to play the game, I found myself studying both the notes and several books about the Afrika Korps for clues on how to capture Tobruk and live to brag about it.

I've always enjoyed strategy games, so *Knights of the Desert* has become one of my favorites. The emphasis is on strategy, just what you would expect from a company named Strategic Simulations. C

HOW TO ENTER PROGRAMS in *Power/Play*

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN,RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270", type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the 'wrong' line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88) characters on one line. You can enter these lines by abbreviating the commands when

CHART OF SPECIAL CHARACTER COMMANDS

"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ^]" = PI SYMBOL
"[↑]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed.

THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is 'running'. Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

Send your questions to:

Power/Play Magazine
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

How to Use the Magazine Entry Program

The Magazine Entry Program on the facing page is a machine language program that will assist you in entering the programs in this magazine correctly. It is for use with the Commodore 64 only and was written by Mark Robin using the IEA Editor/Assembler. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 50052, and just lets you know that the program is running. If everything is ok, the program will finish running and end. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem.

Once the program has run, it is in memory ready to go. To activate the program, type SYS49152 and press RETURN. When the READY prompt is displayed, type TEST and press RETURN. You are now ready to enter the programs from the magazine.

Typing the Programs

All the program listings in this magazine that are for the 64 have an apostrophe followed by four letters at the end of the line (i.e., 'ACDF). The apostrophe and letters *should* be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it *does not* enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are six error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

PARENTHESIS: This means that you forgot (or added) a parenthesis somewhere in the line. Check the line in the magazine again and correct the parenthesis.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT..) incorrectly. Check the line in the magazine again and check your spelling.

# OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

Magazine Entry Program

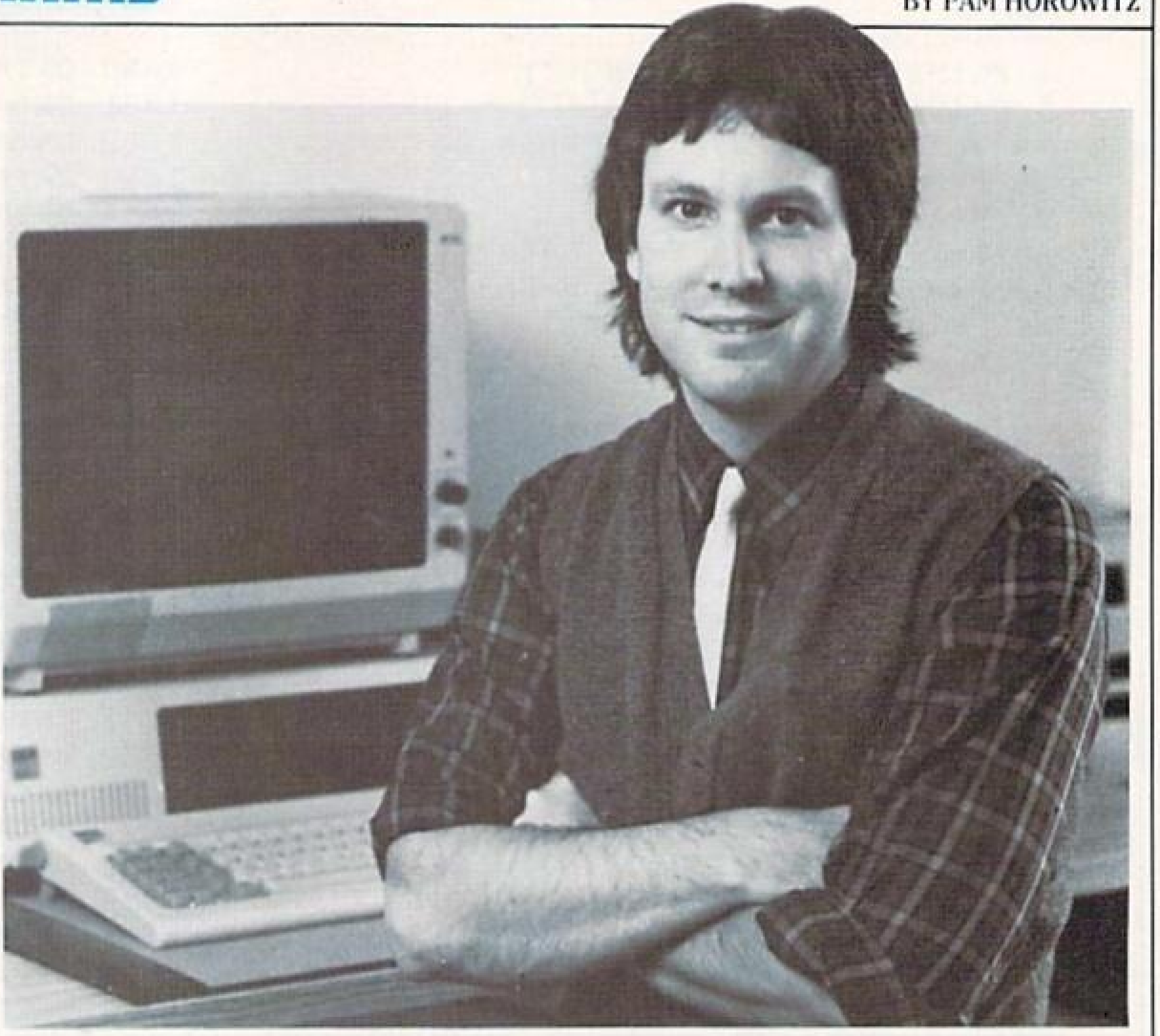
The Magazine Entry Program is available on disk, along with the other programs in this magazine, for $9.95. To order contact Loadstar at 1-800-831-2694.

```
1 PRINT "[CLEAR]POKING-";
5 P=49152 :REM $C000
10 READ A$:IF A$="END"THEN 80
20 L=ASC(MID$(A$,2,1))
30 H=ASC(MID$(A$,1,1))
40 L=L-48:IF L>9 THEN L=L-7
50 H=H-48:IF H>9 THEN H=H-7
60 PRINT"[HOME,RIGHT12]"P;
70 B=H*16+L:POKE P,B:T=T+B:P=P+1
   :GOTO 10
80 IF T<>103233 THEN PRINT"MISTAKE IN
   DATA --> CHECK DATA STATEMENTS":END
90 PRINT"DONE":END
1000 DATA 4C,23,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,00,00,0D
1002 DATA 00,58,C1,5E,C1,66,C1,76
1003 DATA C1,83,C1,8F,C1,EA,EA,EA
1004 DATA 4C,83,C0,A2,05,BD,1D,C0
1005 DATA 95,73,CA,10,F8,60,A0,02
1006 DATA B9,00,02,D9,3C,C1,D0,0B
1007 DATA 88,10,F5,A9,01,8D,10,C0
1008 DATA 4C,1F,C1,60,A0,03,B9,00
1009 DATA 02,D9,38,C1,D0,E0,88,10
1010 DATA F5,A9,00,8D,10,C0,4C,1F
1011 DATA C1,60,A0,03,B9,00,02,D9
1012 DATA 34,C1,D0,E0,88,10,F5,A0
1013 DATA 05,B9,A2,E3,99,73,00,88
1014 DATA 10,F7,A9,00,8D,18,D4,4C
1015 DATA 1F,C1,E6,7A,D0,02,E6,7B
1016 DATA 4C,79,00,A5,9D,F0,F3,A5
1017 DATA 7A,C9,FF,D0,ED,A5,7B,C9
1018 DATA 01,D0,E7,20,5A,C0,AD,00
1019 DATA 02,20,A3,C0,90,DC,A0,00
1020 DATA 4C,EA,C1,C9,30,30,06,C9
1021 DATA 3A,10,02,38,60,18,60,C8
1022 DATA B1,7A,C9,20,D0,03,C8,D0
1023 DATA F7,B1,7A,60,18,C8,B1,7A
1024 DATA F0,35,C9,22,F0,F5,6D,05
1025 DATA C0,8D,05,C0,AD,06,C0,69
1026 DATA 00,8D,06,C0,4C,BD,C0,18
1027 DATA 6D,07,C0,8D,07,C0,90,03
1028 DATA EE,08,C0,EE,0B,C0,60,18
1029 DATA 6D,0A,C0,8D,0A,C0,90,03
1030 DATA EE,09-C0,EE,0C,C0,60,0A
1031 DATA A8,B9,11,C0,85,FB,B9,12
1032 DATA C0,35,FC,A0,00,A9,12,20
1033 DATA D2,FF,B1,FB,F0,06,20,D2
1034 DATA FF,C8,D0,F6,20,54,C3,20
1035 DATA 7E,C3,20,E4,FF,F0,FB,A0
1036 DATA 1B,B9,3F,C1,20,D2,FF,88
1037 DATA 10,F7,68,68,A9,00,8D,00
1038 DATA 02,4C,74,A4,4B,49,4C,4C
1039 DATA 54,45,53,54,41,44,44,91
1040 DATA 91,0D,20,20,20,20,20,20
1041 DATA 20,20,20,20,20,20,20,20
1042 DATA 20,20,20,20,20,20,91,0D
1043 DATA 51,55,4F,54,45,00,4B,45
1044 DATA 59,57,4F,52,44,00,23,20
1045 DATA 4F,46,20,43,48,41,52,41
1046 DATA 43,54,45,52,53,00,55,4E
1047 DATA 49,44,45,4E,54,49,46,49
1048 DATA 45,44,00,4E,4F,20,43,48
1049 DATA 45,43,4B,53,55,4D,00,50
1050 DATA 41,52,45,4E,54,48,45,53
1051 DATA 49,53,00,C8,B1,7A,D0,FB
1052 DATA 84,FD,C0,09,10,03,4C,C7
1053 DATA C1,88,88,88,88,88,B1,7A
1054 DATA C9,27,D0,13,A9,00,91,7A
1055 DATA C8,A2,00,B1,7A,9D,3C,03
1056 DATA C8,E8,E0,04,D0,F5,60,4C
1057 DATA F2,C2,A0,00,B9,00,02,99
1058 DATA 40,03,F0,F2,C8,D0,F5,A0
1059 DATA 00,B9,40,03,F0,E8,99,00
1060 DATA 02,C8,D0,F5,20,D7,C1,4C
1061 DATA 56,C2,A0,0B,A9,00,99,03
1062 DATA C0,8D,3C,03,88,10,F7,A9
1063 DATA 80,85,02,20,1B,C3,A0,00
1064 DATA 20,9B,C1,20,CA,C1,20,31
1065 DATA C2,E6,7A,E6,7B,20,7C,A5
1066 DATA A0,00,20,AF,C0,F0,CD,24
1067 DATA 02,F0,06,20,D7,C0,4C,12
1068 DATA C2,C9,22,D0,06,20,BC,C0
1069 DATA 4C,12,C2,20,E7,C0,4C,12
1070 DATA C2,A0,00,B9,00,02,20,A3
1071 DATA C0,C8,90,0A,18,6D,09,C0
1072 DATA 8D,09,C0,4C,33,C2,88,A2
1073 DATA 00,B9,00,02,9D,00,02,F0
1074 DATA 04,E8,C8,D0,F4,60,18,AD
1075 DATA 0B,C0,69,41,8D,0B,C0,38
1076 DATA AD,0C,C0,E9,19,90,06,8D
1077 DATA 0C,C0,4C,63,C2,AD,0C,C0
1078 DATA 69,41,8D,0C,C0,AD,05,C0
1079 DATA 6D,07,C0,48,AD,06,C0,6D
1080 DATA 08,C0,8D,0E,C0,68,6D,0A
1081 DATA C0,8D,0D;C0,AD,0E,C0,6D
1082 DATA 09,C0,8D,0E,C0,38,E9,19
1083 DATA 90,06,8D,0E,C0,4C,96,C2
1084 DATA AD,0E,C0,69,41,8D,0E,C0
1085 DATA AD,0D,C0,E9,19,90,06,8D
1086 DATA 0D,C0,4C,AB,C2,AD,0D,C0
1087 DATA 69,41,8D,0D,C0,A0,01,AD
1088 DATA 0B,C0,CD,3C,03,D0,20,C8
1089 DATA AD,0C,C0,CD,3D,03,D0,17
1090 DATA C8,AD,0D,C0,CD,3E,03,D0
1091 DATA 0E,AD,0E,C0,CD,3F,03,D0
1092 DATA 06,20,64,C3,4C,7A,C0,AD
1093 DATA 10,C0,D0,11,98,48,68,4C
1094 DATA F7,C0,AD,10,C0,F0,01,60
1095 DATA A9,04,4C,F7,C0,A4,FD,A9
1096 DATA 27,91,7A,A2,00,C8,BD,0B
1097 DATA C0,91,7A,C8,E8,E0,04,D0
1098 DATA F5,A9,00,91,7A,20,64,C3
1099 DATA 4C,7A,C0,A0,00,B9,00,02
1100 DATA F0,11,C9,28,D0,03,EE,03
1101 DATA C0,C9,29,D0,03,EE,04,C0
1102 DATA C8,D0,EA,AD,03,C0,CD,04
1103 DATA C0,D0,01,60,A9,05,4C,F7
1104 DATA C0,A9,20,8D,00,D4,8D,01
1105 DATA D4,A9,09,8D,05,D4,A9,0F
1106 DATA 8D,18,D4,60,20,41,C3,A9
1107 DATA 81,20,77,C3,A9,80,20,77
1108 DATA C3,4C,71,C3,20,41,C3,A9
1109 DATA 11,20,77,C3,A9,10,20,77
1110 DATA C3,A9,00,8D,04,D4,60,8D
1111 DATA 04,D4,A2,70,A0,00,88,D0
1112 DATA FD,CA,D0,FA,60,END
```

BEHIND THE PROGRAMS

BY PAM HOROWITZ

Tom Snyder is Strictly Hands-on for Kids



The designer of Snooper Troops *and other educational simulations for youngsters has created a world-crisis simulation that runs on two computers in different locations.*

Tom Snyder designs software with staying power. His programs are realistic simulations that stretch the power of the computer to make you feel like you're really there. The 35 year-old software designer has no use for arcade type shoot-'em-ups. "I like software that lets you discover something new—even after the fifteenth time you've played it," he explains.

The Halley Project: A Mission in Our Solar System is one of Tom's latest and most exciting programs. It puts players in command of a space ship as they navigate through a totally accurate simulation of the solar system. The mission is accomplished by skillful maneuvering past planets, moons, and constellations.

The Halley Project was the combined effort of a very dynamic duo—Tom Snyder and Omar Khuduri. Omar is a talented software designer and a member of the Tom Snyder Production team. According to Tom, "*The Halley Project* took one year and two months, four people, and endless hours of Omar and I staring at each other in outer space."

Tom's soon to be released software spectacular, *The Other Side*, is the computer equivalent of a major motion picture. It deals with a world of crisis between two superpowers and is the first commercial program designed to run on two computers at the same time in different locations. The two-computer option allows players to use a modem and play the game without ever seeing or knowing their opponent.

"*The Other Side* is a war game where the object is to make peace instead of war," Tom explains. "Each superpower has access to powerful weapons, as well as other more peaceful tools. Players have to make the right decisions to avoid using the weapons. If a bomb goes off, the computer stops and the game is over. Just like the real world, *The Other Side* takes place in an environment of tension and conflict over power and resources."

The Other Side is the first game published by Tom Snyder Productions for Tom Snyder Productions. The program means a lot to Tom, and he hopes it will help kids understand international conflict and how it can be avoided. Because of the game's significance, Tom decided to publish it himself so he could have complete control of the finished product. "I was afraid that another publishing company might make cute little bombs with happy faces or give it a title like 'Make War and Blow Up Your Neighbor'!"

Tom was bitten by the computer bug at the age of 14 when he decided he'd like to build his own computer. He came up with a design and sent it off to a major computer manufacturer. The company responded by sending Tom a large supply of obsolete equipment and a note saying, "We liked your computer design. Use these parts to build it, and remember us when you get older."

That was the beginning of what Tom calls his "computer nerd period"—long before it was considered cool to be a hacker. He worked long hours to build "a humungous computer" which he then hooked up to an old typewriter and entered in a science fair. "Then at age 16, I kissed it all good-bye," says Tom. "I didn't have a single friend who knew or cared about computers."

Tom turned off of computers and onto rock music. After college, he went to Los Angeles and recorded for Capitol Records. But rock and roll was a tough field, and Tom needed money to live on until his big break came. He got a job as a teacher and continued to record music in his spare time.

Tom's time in the classroom turned

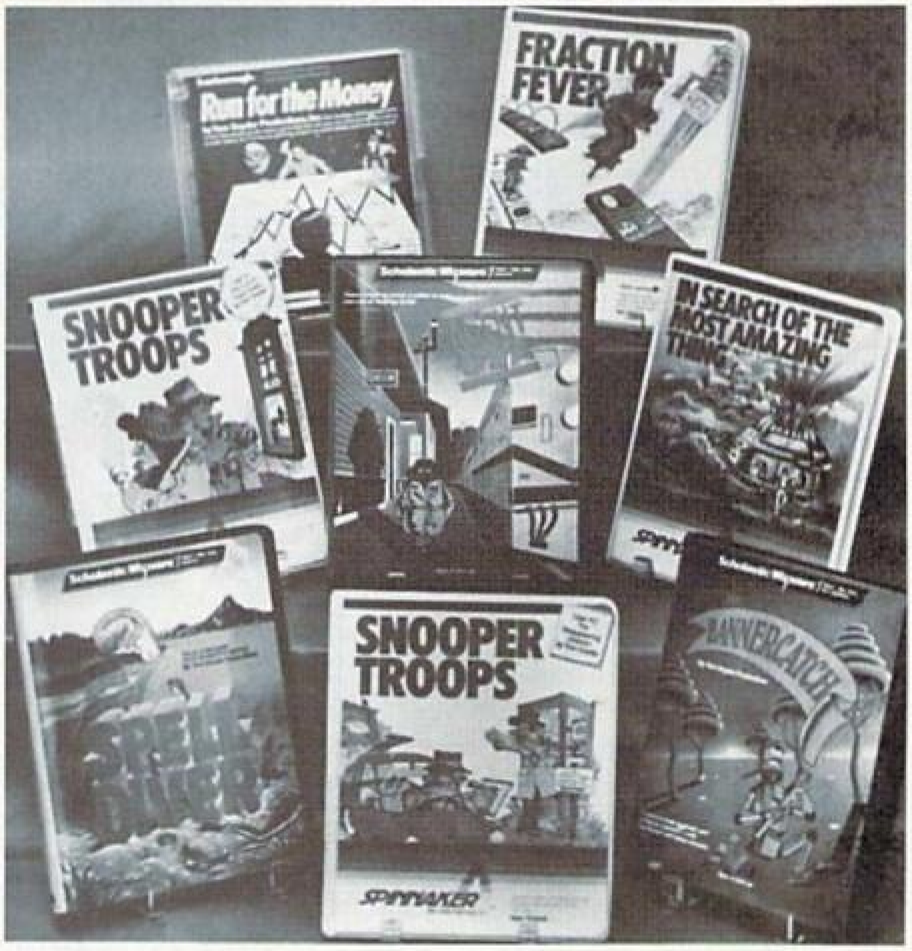
out to be the real turning point in his career. It was there that he developed his philosophy toward kids, classrooms and computers. He believes real learning doesn't happen simply by reading a book, but occurs only when children get involved in hands-on projects.

Since daily field trips weren't in his budget, Tom began to create his own simulation games. If his class was studying geography, the students became the ship's crew on a simulated ocean liner. If the subject was archeology, off they would go on a simulated expedition to some remote corner of the earth.

It wasn't long before Tom realized the potential of the computer as a replacement for pencil and paper simulation. With a computer, his students could work in teams and keep accurate records of their research. So Tom bought a computer with 4K memory for his classroom. "At first I wondered how I could ever use 4K. Then I bought my 16K chip, my 32K expansion module, and my 48K computer!"

While he believed in the computer as a valuable learning tool, Tom never encouraged his students to become hackers. He thinks that "intense hacking is the sign of a problem, an escape for kids who don't feel very good about themselves."

Tom believes that real learning doesn't happen simply by reading a book, but occurs only when children get involved in hands-on projects.



Tom left the classroom in 1980 to form his own software development company. He wanted to devote all his time to creating quality software that was both educational and entertaining. Tom Snyder Productions has since grown from a staff of two to seventeen employees, whose specialities include graphics, programming, marketing, management, editing, and play testing. "It's my job," Tom says, "to make sure the water cooler is working!"

Tom Snyder and children from Boston-area schools work together on a game.

Tom's first programs, the five-part "Search" Series, take students on computer field trips and are used in classrooms all over the country. The Search Series was followed by *Snooper Troops*, marketed by Spinnaker, which made the top ten list of best-selling software.

Other Snyder simulations include *In Search of the Most Amazing Thing*, also marketed by Spinnaker, and *Agent U.S.A.*, *Spelldiver*, and *Bannercatch*, marketed by Scholastic. Tom has recently added a line of computer games based on children's novels. *Swiss Family Robinson*, one of Spinnaker's "Windham Classics," is the first in this series. Another recent addition is *Rock 'N Rhythm*, a program which allows players to compose their own tunes without any formal music instruction.

Part of Tom's success can be attributed to the fact that he's a bit of a dreamer; he imagines the impossible and tries to make it happen. Tom would like to be the first to come up with edible software, complete with chips and dip. He also envisions "Scratch and Sniff" software with menu selections of hundreds of smelly little pixels! C

BY ARNIE KATZ

Jazz Scats: Anatomy of a Super Software Band

Emmy award winner Gerri Brioso with colleagues Richard (L.) and Paul Freitas.

The New York City-based music/art/computer trio called the Dovetail Group, better known as the Jazz Scats, has enriched both television and home computing with its gentle humor and multi-faceted innovations. Not only were brothers Richard and Paul Freitas nominated for a 1983 Emmy for "Outstanding music composition/direction in children"s programming" and have won four music awards, but Gerri Brioso took home a 1983 Emmy, her fifth nomination, for her animations on Sesame Street. And, of course, the Dovetail Group has authored three popular programs for the Commodore 64 published by CBS Software: *Coco-Notes*, *Half-Time Battlin' Bands*, and *Movie Musical Madness*.

It began when Gerri's one day of reluctant consulting work for Children's Television Workshop's Sesame Place amusement park turned into a two-year project. During this period, she worked on more than 60 computer games for kids, one of the park's mainstays. It was this project which ultimately reunited the three Long Island, New York, natives.

Sesame Place brought in Richard, a keyboardist, and Paul, a trumpet player, to add sound and music to some of the programs. As musicians, composers, and record producers, the brothers' response to entering the burgeoning field of computer music was scarcely more enthusiastic than Gerri's.

"They naturally assumed we would want to get in on this great new thing," says Richard. "We told them 'no,' but we ended up taking the job anyway." The first few experiences composing by computer proved quite frustrating. "It took a whole day to write just one musical phrase. I could've played it a thousand times with a regular instrument."

> *The creative forces behind* Movie Musical Madness *and* Coco-Notes *didn't like computers very much—until they hooked up with Children's Television Workshop.*

When Joyce Hakansson left Children's Television Workshop to form her own software development company, she asked Gerri to continue to work with her on a computer software project for Milton Bradley. Gerri's distinctive approach to game design, crystalized during those two years of intense creativity for Sesame Place, now came to the fore.

"I suggested that we treat each program like a little television production," she says. "That means each program should have sound and music as well as good graphics and animation." As a result, the Freitas brothers were brought into the project.

At this point, Gerri, Richard and Paul worked together, but they weren't really a team. "It was more like we were doing different ends of the same project, both working through the same middleman," Paul explains. The end of the project signalled a momentous change for all three.

"Everyone had to fly out to the West Coast once a month to work on the project," says Paul. "They wanted us to move out there, but all of us wanted to stay in New York."

"Joyce (Hakansson) was good to us," Gerri says of her mentor, "but we wouldn't move to California. No way." The best alternative, the three finally agreed, was to form their own team right in the Big Apple.

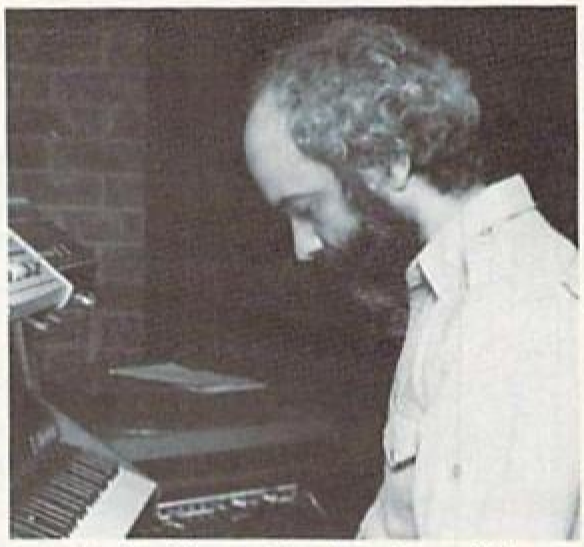
Explains Richard, "We chose the name Dovetail, because all our work was connected and seemed to fit together so well."

"Of course, the name does have a few drawbacks occasionally," Richard notes. "Sometimes we get frantic calls asking us to come over and do some emergency carpentry."

Which comes first, the pictures or the sounds? As with any improvisational group, there's no hard and fast answer. "The inspiration for *Coco-Notes* was a tropical scene I drew as the background for the play field," says Gerri. "That suggested a certain type of music to Richard and Paul, and we took off from there."

"And *Half-Time Battlin' Bands* started just the opposite way," Paul continues. "We wrote some marching music, and that suggested the overall theme of the game, a football half-

> *"We treat each program like a little television production. That means each program should have sound and music as well as good graphics and animation."*



time show."

Richard and Paul have completely overcome their original skepticism about computer music. In fact, they are now among the medium's strongest boosters. "You can hear things you've never been able to hear before," states Paul. "It has totally eliminated any need for me to play the trumpet."

"Computers let composers do the impossible, because of their precision. You can develop complicated settings and modes and play pieces which a flesh-and-blood musician might take 20 years to learn to play."

The sound generator of a home computer is so exact that Richard and Paul spend extra hours injecting the fallible, human element into music created with their machines.

"Some classical composers went through their entire careers without once hearing their music played properly," adds Richard.

"If Bach were alive today, you'd find him sitting at his Commodore 64," Gerri states. "Just think of all the variations."

This may be a slight exaggeration, but the 64 does play a pivotal role in the composing process. It serves as a controller for advanced electronic synthesizers. A MIDI (Musical Instrument Digital Interface) makes the digital recording possible of whatever Richard and Paul play on their synthesizer keyboards. It does this by converting the analog signals of music to digital signals that the computer can use. The computer can then play the music back through the synthesizer keyboard note for note whenever desired.

To intensify the connection between the designers and the players, Dovetail hit on the idea of including a flexible record with instructions in each game package. "They may not pick up all the nuances of the rules," admits Paul, "but the records give gamers another way to get to know us." It's almost as much fun to listen to Swivel Hips, Wahoo and Mr. Bassman be-bop their way through the routine of play for *Movie Musical Madness* as it is to actually produce animated mini-movies. (And, yes, there is a printed folder that helps users get all the little details, too.)

The ability to constantly refine and revise a work in progress is another reason Gerri prefers computer animation to the older film techniques. "The computer is the most incredible art tool ever invented," she says. "It's like the magic slates we all had as kids. You can draw a picture, and if you don't think it's just right, you can get rid of some or all of it instantly and try again."

She also attributes today's greater use of animation to the influence of the computer. A television show can produce a minute of finished computer animation for $2,000. The same footage would cost up to $7,000 if film animation is used. "And with the computer, you can monitor what you're doing every step of the way without wasting any time," notes Gerri. "In film animation, you've got to wait for film to be developed."

Although the letterheads and business contracts say "The Dovetail Group," the trio is most familiar to computer software lovers as the Jazz Scats. Swivel Hips (Gerri), Wahoo (Paul), and Mr. Bassman (Richard) are on the beginning screens of most of the group's titles. Worldwide Licensing and Merchandising Corporation recently signed an exclusive international agreement with Dovetail to sell Jazz Scats totebags and the like.

The Jazz Scats idea grew out of a segment the Dovetail Group created for Sesame Street, which featured a trio of juvenile musicians called the Jazz Brats. A CBS Software executive saw the characters and hastily locked up the design group with a hefty development check.

"We sold our CBS games as simple one-page write-ups," says Richard. "That's when software was really hot. Now, just like all the other design houses, we've got to put together an elaborate proposal if we expect a publisher to show some interest."

CBS Software insisted on utilizing the Jazz Scats cartoon characters in all Dovetail Group products and the team enthusiastically agreed. They visualized their programs as a mini-series, so it made sense to continue the same stars from title to title.

While pursuing other activities, which include cable and broadcast television and industrial films, the Dovetail Group is currently gearing up for its next generation of software. Though the band is understandably close-mouthed about the exact nature of forthcoming programs, their past achievements promise that the next series of Jazz Scats games and entertainments will titillate the senses as it stimulates the mind.

SUMMER GAMES II

Continued from page 32

tegic advantage that can be gained along the way shouldn't be incorporated into your game plan. The *Summer Games II* manual serves as an informative coach, giving some excellent tips to get you started on your winning ways. I've discovered a few additional strategies that you may find helpful.

Equestrian: This challenge tests your ability to judge the correct instant to send your horse up and over an approaching obstacle. With barriers varying in size and width, there will undoubtedly come a time when you miss your mark, leaving your thoroughbred standing complacently motionless before an intimidating wall. Your manual then instructs you to "go back far enough . . . to build up speed for the jump." Well, these animals must have the most powerful hind legs in the history of racing, for I have found that any barrier can be managed with only *one* step to the rear. In a contest where every second counts, cutting down on extraneous trotting could mean the difference between silver and gold.

Javelin: The javelin throw is a two-stage event. First the contestant is required to tap his joystick fire button to gain speed, and then he must tug the stick to the left to break stride, set the throwing angle, and release his projectile.

If you are usually a thumb-pumping button pusher, switch to a grip where you can hit the fire button with your index finger instead. My experiences show that this method allows you to tap faster, and consequently, throw farther.

Don't be afraid to step on the chalk fault line. The judges are lenient, and will allow the throw as long as you don't step beyond the penalty line.

To find the aerial arc that will result in the greatest tossing distance, use the backdrop of the crowd as your guide. A javelin's flight whose apex cuts a visual path across the third row from the top of the stands will usually be the best.

When entering the second phase of this trial, keep hitting the fire button until after you pull the stick. This will assure that there is no gap in the transition, packing the most power into your launch.

Cycling: The trick here is to rotate your joystick to coincide with the inside pedal movement of your bicycle. It sounds easy, but once the wheels are in motion, it can be hard to follow your cyclist's foot position. It's at this point that the contest taps your ability to sustain an achieved rhythm. The grip I found to be most useful here is one in which you never hold the joystick at all. Instead, place your palm on the top of the stick, using slight pressure and a circular motion.

High Jump: Success in this track-and-field event will depend on the speed and angle of your approach. Pull back on your stick as soon as your contestant begins running. This will stop his advance to the bar, leaving him in a suspended but controllable state. You can then take the time to move him left or right, placing him in any desired position without losing the chance to build speed.

WINTER GAMES

Continued from page 24

wind-whistling air-borne glide, and the plopslide (success) or muffled crunch (failure) of touchdown. And your in-flight posture will actually affect your distance, with the aerodynamic head-over-ski-tips position correctly giving the best results. When your winning effort brings you to a halt amid the roar of the appreciative crowd, it will be acquired skill, not chance, that secured the victory.

Elsewhere on this busy mountain range, gravity is pulling two men through a winding crevice at speeds exceeding 90 miles per hour. It's the bobsled run, Commodore style. Here Epyx, using a three-sectioned screen division, lets us monitor every aspect of this daredevil challenge.

The left half of the playfield gives an overhead view of the entire course, complete with surrounding landscape, bridge-style viewing stations, and finish line gallery. Take the time to get a good look at the layout before you push off, because once the action starts, there won't be many chances for cross-referencing.

The remaining screen section is again halved. The bottom corner keeps tabs on speed and time, while the top portion displays an incredible low-angle view from behind the sled, as if taken by a suicidal cameraman positioned inside the icy chute. Braking is allowed (although no mention is made of it in the instructions, pulling back on the joystick will slow your sled considerably), but steering is really the only controller input required. After all, swiftness is the name of the game. And even if the speed thrills don't hook you, the eye-pleasing graphics will still keep the passenger list forever booked.

A trio of skating events round off the competition. A head-to-head split-screen speed skating race stands as an all-out power test, while a pair of figure skating events relies more on grace and timing.

The first exhibition in the figure skating event, called the "short program," is a sixty-second timed exercise of seven compulsory movements. The longer "free style" event allows for more creativity by providing some foot-tapping background music to which you choreograph the action. Neither performance will strain any muscles or drill any reflexes, since the spins and jumps are all initiated with a simple joystick tap. But these contests do award points for technically sound, aesthetically pleasing routines—an area that is relatively unexplored in computer gaming. Credit should be given to the designers for successfully creating an event that many may have disregarded as unadaptable.

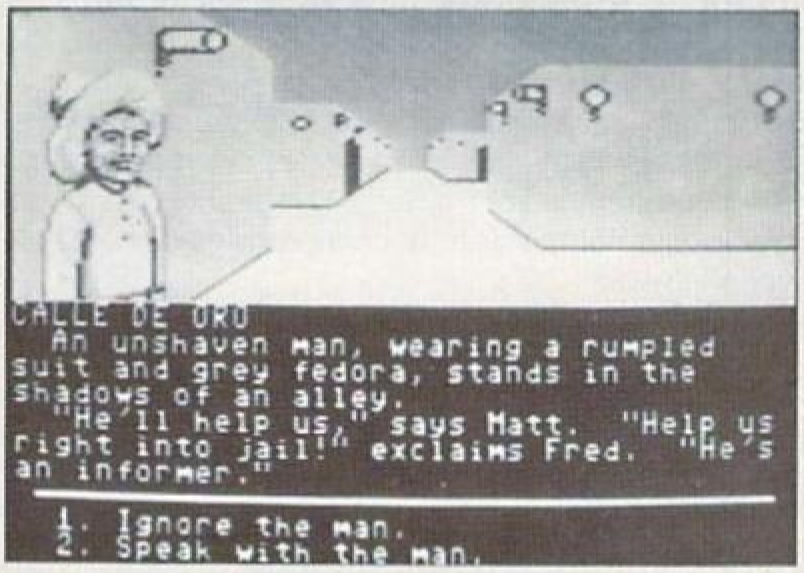
The package also has the customary Epyx Olympic touches, including the opening ceremonies, world record vanity board, practice mode, awards ceremony and 8-player/18-country representation option. It's the kind of quality work that will keep their ever-growing audience asking for more. And with spring and autumn still untouched, I invite Epyx to challenge tradition and institute some new seasonal games.

Olympic lawn bowling, anyone?

Choose Your Own Adventure

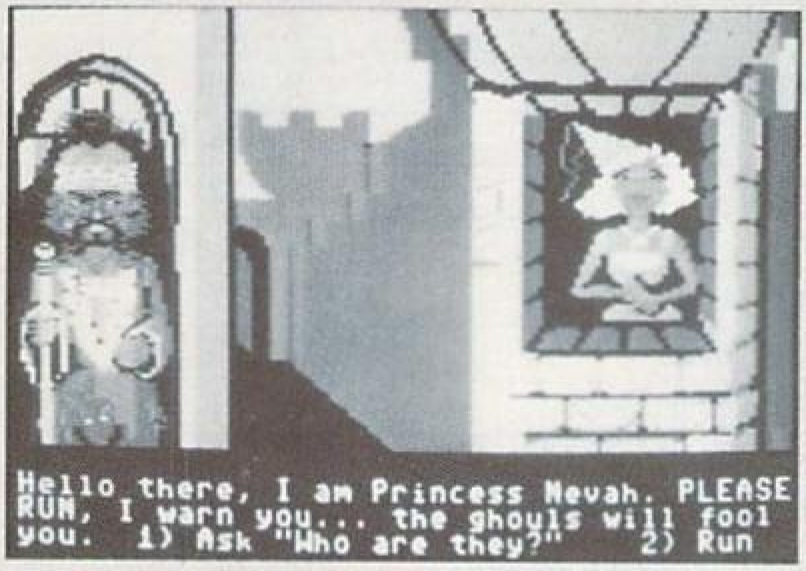
Bantam Electronic Publishing, a division of Bantam Books, has announced **Escape** and **The Cave of Time**, the first two software adventure games for the Commodore 64 in the Choose Your Own Adventure software series. Based on the books by the same name, **Escape** and **The Cave of Time** are multi-plot strategy games with animated graphics and arcade-style action for children ages ten and up.

Escape challenges the player to lead three characters out of a maze-like city across enemy territory. The three sequences can be played through serially or practiced individually, and feature flying and driving simulations.



```
CALLE DE ORO
  An unshaven man, wearing a rumpled
suit and grey fedora, stands in the
shadows of an alley.
  "He'll help us," says Matt.  "Help us
right into jail!" exclaims Fred.  "He's
an informer."

  1. Ignore the man.
  2. Speak with the man.
```



```
Hello there, I am Princess Nevah. PLEASE
RUN, I warn you... the ghouls will fool
you.  1) Ask "Who are they?"     2) Run
```

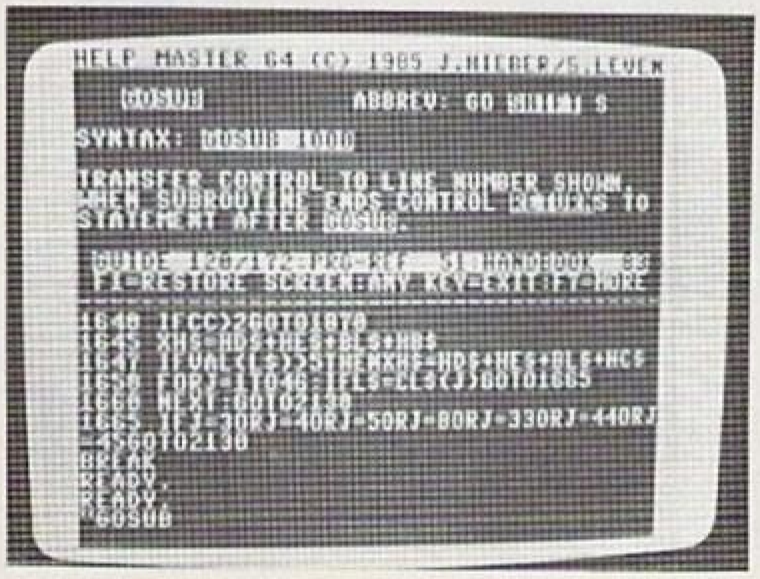
Objects are misplaced in time in **The Cave of Time**, a travel adventure. The goal is to return these objects to their rightful owners with the fewest possible moves. Along the way the player must fight ghouls, ride prehistoric mammoths, and battle assassins.

The games retail for $34.95 each. (Bantam Electronic Publishing, 666 Fifth Avenue, New York, New York 10103.)

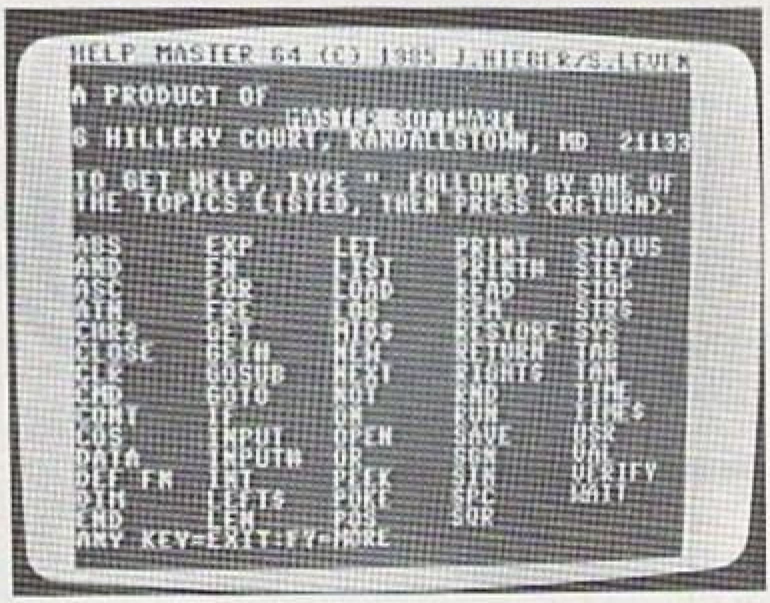
Commodore 64 Help Screens

Help Master 64 from Master Software provides instant help screens for all 69 BASIC and Commodore operating-system commands. Showing correct syntax for each BASIC command, it provides reference page numbers for the **Commodore 64 User's Manual**, the **Commodore 64 Programmer's Reference Guide**, and the **Handbook of BASIC on the Commodore 64**. The program does not affect loading, saving, editing, or execution of BASIC programs, and takes none of the available BASIC RAM memory.

The complete package, which includes **Help Master 64** on disk or cassette and the **Handbook of BASIC**, retails for $24.95. The **Help Master 64** program or the **Handbook of BASIC** may also be purchased separately. (Master Software, 6 Hillery Court, Randallstown, MD 21133.)



```
HELP MASTER 64 (C) 1985 J.HIEBER/S.LEVEN
  GOSUB           ABBREV: GO [illegible] S
SYNTAX: GOSUB 1000
TRANSFER CONTROL TO LINE NUMBER SHOWN.
WHEN SUBROUTINE ENDS CONTROL RETURNS TO
STATEMENT AFTER GOSUB.
 GUIDE 120/172 [illegible] HANDBOOK 88
 F1=RESTORE SCREEN:ANY KEY=EXIT:F7=MORE
1640 IFCC>2GOTO1870
1645 XH$=HD$+HE$+BL$+HB$
1647 IFVAL(L$)>5THENXH$=HD$+HE$+BL$+HC$
1650 FORJ=1TO46:IFL$=LL$(J)GOTO1665
1660 NEXT:GOTO2130
1665 IFJ=30ORJ=40ORJ=50ORJ=80ORJ=330RJ=440RJ
=45GOTO2130
BREAK
READY.
READY.
GOSUB
```



```
HELP MASTER 64 (C) 1985 J.HIEBER/S.LEVEN
A PRODUCT OF
            MASTER SOFTWARE
6 HILLERY COURT, RANDALLSTOWN, MD  21133
TO GET HELP, TYPE " FOLLOWED BY ONE OF
THE TOPICS LISTED, THEN PRESS <RETURN>.
ABS     EXP     LET     PRINT   STATUS
AND     FN      LIST    PRINT#  STEP
ASC     FOR     LOAD    READ    STOP
ATN     FRE     LOG     REM     STR$
CHR$    GET     MID$    RESTORE SYS
CLOSE   GET#    NEW     RETURN  TAB
CLR     GOSUB   NEXT    RIGHT$  TAN
CMD     GOTO    NOT     RND     TIME
CONT    IF      ON      RUN     TIME$
COS     INPUT   OPEN    SAVE    USR
DATA    INPUT#  OR      SGN     VAL
DEF FN  INT     PEEK    SIN     VERIFY
DIM     LEFT$   POKE    SPC     WAIT
END     LEN     POS     SQR
ANY KEY=EXIT:F7=MORE
```

NEXT MONTH

WATCH FOR THESE UPCOMING ISSUES

Commodore Microcomputers, January/February: Now there's software to help you relax, break bad habits, understand yourself better, know your I.Q., and probe the minds of your friends. Learn about these new uses for your computer in our overview of PsychoSoftware.

AND YOU'LL ALSO FIND:

- A Buyer's Guide to BASIC Compilers.
- Free programs for the Commodore 64 and Commodore 128.
- Our monthly Amiga Update.
- A lawyer's view on software "shrink-wrap" licenses.
- Reviews of the innovative software for children, including **Leaps and Bounds, Alice in Wonderland,** and **Project Space Station.**

Commodore Power/Play, February/March: Programmers get a free BASIC language extender to help them easily create complex animated graphics, new fonts, and windows in Commodore 64 programs. Reviews of **Wishbringer, Jet,** the Lucasfilm 3-D games **Rescue on Fractalus** and **Ballblazer,** and more.

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"WORD INVADERS is fantastic" **Editors of Consumer Guide**

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*No Reader Service No. Given

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470 Needles Drive
San Jose, CA 95112

A Printer For All Reasons

Search For The Best High Quality Graphic Printer

If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all the major brands and tested them.

Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We didn't want a "close-out special" of an obsolete product that some manufacturer was dumping, so we limited our search to only those new printers that had the latest proven technology. We wanted to give our customers the **best** printer on the market today at a bargain price.

The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the SP-1000 from Seikosha, a division of Seiko (one of the foremost manufacturers in the world). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full bi-directional, logic seeking, true descender printer.

"NLQ" Mode

One of our highest concerns was about print quality and readability. The SP-1000 has a print mode termed Near Letter Quality printing (NLQ mode). This is where the SP-1000 outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 24 (horizontal) by 18 (vertical). This equates to 41,472 addressable dots per square inch. Now we're talking ***quality*** printing. It looks like it was done on a typewriter. You can even print graphics using the standard graphics symbols built into your computer. The results are the best we've ever seen. The only other printers currently available having resolution this high go for $500 and more *without* the interface or cable needed to hook up to your computer.

Features That Won't Quit

With the SP-1000 your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 35 character styles including 13 double width and 3 reversed (white on black) styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print H_2O or X^2. This fantastic machine will do it automatically, through easy commands right from your keyboard. Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) or use *italics* to make the words stand out. Or, if you wish to be even more emphatic, underline the words. You can combine many of these modes and styles to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line. You have variable line spacing of 1 line per inch to infinity (no space at all) and 143 other software selectable settings in between. You can control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and . . . VOILA! The letter now fits on one page.

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Forms? Yes! Your Letterhead? Of Course!

Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4 to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, labels, anything you choose. Any size to 10" in width. In fact this unit is so advanced, it will load your paper automatically. Multiple copies? Absolutely! Use forms (up to 3 thick). Do you want to use spread sheets with many columns? Of course! Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½" wide page, and you can do it quietly. The SP-1000 is rated at only 55 dB. This is quieter than any other impact dot matrix printer that we know of and is quieter than the average office background noise level.

Consistent Print Quality

Most printers have a ribbon cartridge or a single spool ribbon which gives nice dark printing when new, but quickly starts to fade. To keep the printers output looking consistently dark, the ribbons must be changed quite often. The SP-1000 solves this problem by using a wide (½") ribbon cartridge that will print thousands of pages before needing replacement. (When you finally do wear out your ribbon, replacement cost is only $11.00. Order *#2001.)*

The Best Part

When shopping for a printer with this quality and these features, you could expect to pay around $500 or more. *Not now!* We sell this fantastic printer for **only $259.95! You need absolutely nothing else to start printing — just add paper.**

No Risk Offer

We give you a 2-week satisfaction guarantee. If you are not completely satisfied for any reason we will promptly refund your purchase. A 1-year warranty is included with your printer. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours of receipt.

The Bottom Line

Be sure to specify the order # for the correct version printer designed for your computer.

Commodore C-64 & C-128, Order #2200, cable included

IBM-PC and compatibles, Order #2100, plus 8' cable #1103, $26.00

Standard Parallel with 36 pin Centronics connector, Order #2400, no cable

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Shipping and insurance is $10.00 — UPS within the continental USA. If you are in a hurry, UPS Blue (second day air), APO or FPO is $22.00. Canada, Alaska, Mexico are $30.00 (air). Other foreign is $70.00 (air). California residents add 6% tax. The above are cash prices — VISA and MC add 3% to total. We ship the next business day on money orders, cashiers' checks, and charge cards. A 14-day clearing period is required for checks.

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